Running Head: MANAGING NEUROSURGICAL PROFICIENCY IN U.S. ARMY

U.S. ARMY-BAYLOR UNIVERSITY

GRADUATE PROGRAM IN HEALTH CARE ADMINISTRATION

NEUROSURGICAL PROVIDER PROFICIENCY:

CLARIFICATION OF READINESS AND MANAGEMENT IMPLICATIONS

A GRADUATE MANAGEMENT PROJECT SUBMITTED TO THE

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This research project used qualitative research methods to clarify the concept of surgical proficiency among U.S. Army neurosurgeons. The purpose is to assist effective management decisions and policies through a greater understanding of the complexities of defining, measuring, and influencing proficiency. The data collection included focused interviews with 23 military and civilian experts designed to clarify the concept of proficiency and semi-structured interviews with 9 of 19 active duty neurosurgeons to understand their perspective and concerns. The results found, with very high consistency, that the established proxies of credentialing, board certification, and accreditation are what an organization can and should consider at this time. Additionally, the interviewees expressed that the evaluation of physicians is, at its core, a local function best conducted by peers. In this regard the Army Medical Department has the proper structure and processes that encourage proficiency. Concerning the management of neurosurgeons, the results articulated the persistent dissatisfaction with pay, support staff, and assignments. The management of human resources, including retention and career management, is a critical obstacle in maintaining and improving proficiency in this specialty. This research strongly supports the neurosurgical consultants recommendations submitted to the U.S. Army Surgeon General concerning consolidating assignments, encouraging resource sharing agreements with the Veterans Affairs, and issues of morale. In addition, this research indicates that significant research and changes are necessary to align the Armys use of this specialty with the critical elements of surgical proficiency.

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ABSTRACT

This research project used qualitative research methods to clarify the concept of surgical proficiency among U.S. Army neurosurgeons. The purpose is to assist effective management decisions and policies through a greater understanding of the complexities of defining, measuring, and influencing proficiency. The data collection included focused interviews with 23 military and civilian experts designed to clarify the concept of proficiency and semi-structured interviews with 9 of 19 active duty neurosurgeons to understand their perspective and concerns. The results found, with very high consistency, that the established proxies of credentialing, board certification, and accreditation are what an organization can and should consider at this time. Additionally, the interviewees expressed that the evaluation of physicians is, at its core, a local function best conducted by peers. In this regard the Army Medical Department has the proper structure and processes that encourage proficiency. Concerning the management of neurosurgeons, the results articulated the persistent dissatisfaction with pay, support staff, and assignments. The management of human resources, including retention and career management, is a critical obstacle in maintaining and improving proficiency in this specialty. This research strongly supports the neurosurgical consultant's recommendations submitted to the U.S. Army Surgeon General concerning consolidating assignments, encouraging resource sharing agreements with the Veteran's Affairs, and issues of morale. In addition, this research indicates that significant research and changes are necessary to align the Army's use of this specialty with the critical elements of surgical proficiency.

Neurosurgical Provider Proficiency:

Clarification of Readiness and Management Implications

Through largely anecdotal evidence, Army Medical Department (AMEDD) senior leaders perceive a threat to surgical practice in the military. There is consistent and growing concern in the AMEDD that the type and volume of surgical cases in military facilities cannot sustain the proficiency of surgeons serving on active duty. Because of the serious implications and the complexity of the issues, this concern is often expressed in whispers, not called in alarm. Surgical proficiency involves multiple inputs including the managed care environment, demographics, case mix, and graduate medical education, and multiple outputs that include readiness, retention, and quality of care. At the core of this issue is the proficiency that military surgeons gain through surgical experience -- the actual practice of medicine after completion of their residency. Provider proficiency, however, is a very complex concept. It cannot be easily quantified by the number of surgical cases per physician. Research is needed to clarify key concepts before effective policies affecting provider proficiency can be implemented.

In 2000, the U.S. Army Deputy Surgeon General posed the original question that prompted this study. In correspondence to the Directorate of Health Policy and Services, Major General Patrick Sculley inquired about whether board certification for various specialties had requirements expressed in terms of case mix, types of procedures, and volume. If so, could those requirements approximate the criteria for sustaining surgical skills? If not, what are the competency standards for sustaining surgical skills, and does the Army Medical Department provide the case mix and volume to meet those standards? In essence, the management dilemma is the need to measure and benchmark the experience and training military surgeons receive against valid benchmarks in order to enact policies that maximize provider proficiency.

Research into this management dilemma was quickly frustrated by the complexity of the issue. Despite the tremendous volume of healthcare data captured by the Army Medical Department (AMEDD), a quantitative measure of provider proficiency is difficult, perhaps impossible, without extensive qualitative research or a conceptual foundation

The concept of provider proficiency must be clarified in order for the AMEDD to create effective policies to measure and influence surgical proficiency. The results of this exploratory study can be applied to the development of strategic plans and management reports. A current example is the Balanced Scorecard designed by management consultants Robert S. Kaplan and David P. Norton. The Balanced Scorecard is a strategic planning management system that is being implemented throughout the AMEDD. Among other goals, the Balanced Scorecard seeks to link strategic objectives and measurements, and captures data about intellectual and intangible assets (Kaplan & Norton, p. 18). In order to obtain these goals in a healthcare system, a clear understanding of provider proficiency as an intellectual asset is vital. Additionally, the concept of provider proficiency and the subsequent benefits to military readiness, quality of care, and physician satisfaction and retention, are critical to human resources management. In this regard, qualitative research is pertinent to the consultants who oversee the surgical specialties and the numerous directorates of the U.S. Army Medical Command (USAMEDCOM) that formulate policy.

In order to effectively constrain the scope of this critical topic this, research effort was focused on the surgical subspecialty of neurosurgery. Neurosurgery was selected for two primary reasons. First, the small assessable population of military neurosurgeons facilitated the collection of data through scheduled interviews. Second, the neurosurgical subspecialty does not construct a direct relationship with military readiness, as does emergency medicine.

Neurosurgery, like most disciplines, balances the U.S. Army's need to address both wartime readiness and peacetime medicine, and better depicts the complexities of comprehensive care delivery. It is presumed that the significant concepts and results drawn from the research of military neurosurgery will do more than just assist in the management of that specialty. Ideally, the insight gained by this research can be applied to the management of other surgical specialties and guide effective corporate decisions.

Statement of the question

The business questions addressed by this research are the following: How is proficiency assessed in the neurosurgical subspecialty? What are the readiness and management implications of neurosurgical provider proficiency in a military managed care environment? The terms readiness and management implications refer to the dual mission of the AMEDD to provide both wartime and peacetime healthcare. Policies implemented by the U.S. Army Medical Command must balance these missions (Blanck, 2000). The term neurosurgical providers refers to the small population (N = 19) of fully qualified active duty Army neurosurgeons. And, the "military managed care environment" refers to the current setting in which the armed services operate, dominated by the TRICARE managed care contracts for delivery of peacetime healthcare. Proficiency is the linchpin; it is the concept explored. In order to pose the initial question, a definition from the Merriam-Webster Dictionary was used; proficiency is having "great knowledge and experience in a trade or profession [implying] a thorough competence derived from training and practice" (Merriam-Webster, Inc, 2000). In order to refine the scope of this project, the intense scrutiny of Graduate Management Education (GME) is excluded from this study. Completing internship and residency programs implies the completion of exacting and well-established standards. Although the formal education process is a relevant, perhaps

definitive step to provider proficiency, this research focuses on the continuing careers of military surgeons. Specific subquestions include the following: What are stakeholders' perceptions on the concept of provider proficiency? What can be reasonably used as a metric of neurosurgical provider proficiency? How can this information be used to drive policy decisions concerning neurosurgeons? And, can this information be generalized to other surgical specialties in the Army?

Literature review

A wide range of literature was reviewed in the preparation of this study. Only a small fraction is represented here in an attempt to frame the discussion and to begin clarification. Consistently, the literature expanded the scope of the topic. Each article concerning proficiency, competence, or neurosurgery had a different perspective and focused on different elements of a surgeon's practice. Each element, such as GME or credentialing, is continuously evaluated in detail too granular to serve this exploratory study. Articles from different perspectives were selected in order to draft a conceptual model that would help guide the collection of qualitative data. An additional challenge was the interplay between military medicine and civilian medicine. Clearly, the practice of medicine in the military is governed by the regulations and standards of care in the United States. This is exemplified by the military's compliance with licensure, accreditation, and board certification throughout the system. The obvious exception is combat operations and military deployments. Primarily, the literature review draws from the civilian practice of medicine and healthcare in the United States. One goal of the research is to redefine these concepts for the neurosurgeons in the AMEDD.

The literature review is divided in four sections. First, it begins by describing the increased emphasis businesses are placing on intangible assets and the need to nurture and

monitor those human and intellectual resources. The medical education process is then discussed. An emphasis is placed on board certification and recertification because that process is the most recognized national standard for competence in surgery. Also, the current understanding of the relationship between surgical volume and outcomes is addressed. The third section briefly describes the key concepts in Quality Management, including the accreditation process. Finally, the literature review describes the AMEDD and specifically the current state of the neurosurgical subspecialty in the Army Medical Corps.

Human Resource Management

The exploration into provider proficiency begins on a broad foundation of human resource management. The basic functions of human resources can be categorized in seven major process systems: Job analysis, recruitment and retention, selection and placement, training and development, performance appraisal, compensation, and labor relations (Fottler, Hernandez, & Joiner, 1998). Starting with the aforementioned definition of proficiency as competence derived from training and practice, the concept clearly involves most, if not all, the human resource functions. Although the scope of the study focused on the continuing education of one surgical specialty, all of the human resource functions are relevant. In accordance with the definition of proficiency, a concentration will be placed upon training and development, and performance appraisal. Additionally, the function affecting a surgeon's experience concerns the selection and placement. This is especially notable due to the frequent relocations and various assignments demanded by a military career. Compensation is especially relevant due to the fiscal restraints of the Department of Defense (DOD) health systems and the demands of the skilled profession of surgery. For reasons explained later, the human resource function most relevant to the AMEDD may be recruitment and retention. Retention, like proficiency, is a complex,

multifaceted problem critical to management. A study by the Saratoga institute suggested that higher pay or outside opportunities were not the most common causes of voluntary termination. "An ongoing study now covering over 20,000 cases of voluntary turnover has revealed that 80% of the cases were triggered by problems with a supervisor, working conditions, and perceived lack of career opportunities." The authors continued to describe this as good news. Tight budgets will probably hinder companies from retaining skilled personnel solely through pay raises. Management can actually do something to improve supervisor skills, working conditions, and career opportunities (Fitz-enz & Phillips, 1998, p. 104).

In another contradiction, the authors noted that opportunity might be found in shrinking budgets. They cited the Saratoga Institute report that human resource budgets in American businesses declined by 40% and staffing declined by 25%. The authors believed that by delegating the non-value adding administration to the front line employees or outsourcing these functions by contract, Human Resources can focus on the operating efficiency of the organization (Fitz-enz & Phillips, 1998, p. 3).

Appearing frequently in articles and business prospectuses, it has become cliché to recognize human assets as the most valuable asset to an organization. In order to move beyond the cliché, an organization must not only acknowledge the value of human assets but also manage them effectively and obtain results. In the Harvard Business Review, Dave Ulrich demeaned the traditional role of human resources as "value sapping." The focus, he admonished, should not be on activities such as staffing but on outcomes; "HR should not be defined by what it does but by what it delivers (1998, p. 1224)." Ulrich's four specific demands from human resources are integration with strategy planning and execution, expertise in administrative actions that are measured and proven to be effective, championship of employee morale and working conditions,

and innovation that becomes an agent of continuous transformation. Fitz-enz and Phillips of the Saratoga Institute echoed the same mandate; human resources must move from traditional administrative activities to measurable value added activities that are aligned with business strategy. The authors also emphasize the need for effective communication. The data concerning turnover, absenteeism, employee grievances and morale appear soft, not because they are difficult to measure, but because they are difficult to convert to monetary values (Fitz-enz & Phillips, 1998, p. 39).

The key point drawn from this selected literature is the idea that the human resource department of an organization must actively and aggressively pursue business processes that add value, not just the completion of administrative actions. Acknowledging the value of employees, especially skilled professionals, is insufficient. The execution and the results of human resource management actions must be defined, measured, and communicated. Quantifying the intangible elements of workforce is difficult but it is essential to communicate with the organization in terms that bring accountability to the management of human resources.

Medical Education

Overview of the Medical Education Process

In order to practice independently as a physician or a surgeon, an individual must complete a rigorous educational and examination process. This is especially true as healthcare technology grows demanding greater, more detailed knowledge. Currently about 7% of the health care workforce are physicians and, due to the complexities of medical science, 80% of physicians are specialists (Morais, Pirret, Vaidyanathan, 1999, p. 4).

The formal process of medical education is designed to certify a minimum level of proficiency in order to protect public safety. Describing the process as rigorous is understated.

At the least, education requirements include eight years of intense study. A bachelor's degree or equivalent emphasizing hard sciences and an acceptable score on the Medical College Admissions Test are needed prior to acceptance to medical school. Medical school generally consists of four years in an accredited medical school, serving two years in a laboratory setting and two years as an intern under the close supervision of graduate medical education staff. Medical interns must pass the National Board of Medical Examiners in order to proceed to their residency. Depending upon specialties, residency can take up to seven years. Successful completion of state licensure examination is required to legally practice independently. Only then can the physician or surgeon attempt to obtain Board Certification by the American Board of Medical Specialties, or pursue a fellowship. Specialties in neurosurgery are especially taxing. The neurosurgical residency program at the University of Pittsburgh, for example, takes seven years to complete. At the end of their chief year, a resident has been involved as a primary physician in over 900 surgical cases (University of Pittsburgh, 2000).

The formal educational requirements are compounded by the continuing demands of advances in the practice of medicine, the long-hours, and the pressures of a job involving life and death. In order to balance this perspective, it is noted that physicians and surgeons hold a special, honored place in society. Additionally, their salaries are significantly higher than those found in most professions. The mean net income after expenses for all surgeons is $225,000 and for all physicians is $189,300 (Morais et al., 1999, p. 154).

Recertification

It is especially important to this study to take note of the surgeon's development and achievements after the completion of their graduate medical education. As described, the medical student's aptitude and knowledge are tested during key milestones; application to

medical school, National Board of Medical Examiners, and state licensure. Perhaps more importantly, the resident learns skills and abilities through the actual practice of medicine, and, in this particular study, the practice of surgery. Even if the intensity of residency programs permanently ingrains basic surgical skills, the practice of medicine is dynamic. New technologies and procedures are constantly developed. And, intuitively, some skills and abilities will erode if unused for a significant time. This concern for the time after the rigors of medical education leads to the discussion of recertification or the documentation of sustained proficiency at stipulated intervals.

In October of 1994, the American Board of Medical Specialties (ABMS) sponsored a conference focused on the recertification process. Attending the meetings were 128 participants from 47 organizations involved in certification and licensure, including all 24 medical boards in the ABMS. In the published proceedings of this conference it was noted that recertification was recommended by the Advisory Board of Medical Specialties (later renamed as the American Board of Medical Specialties) as early as 1936. Yet, a “definitive step” was not taken until 1969 when the American Board of Family Practice mandated time limits to all certifications (Mancall & Bashook, 1994, p. xi). In 1982, six of the 24 member boards established time-limited certifications. Currently, all 24 member boards have proposed time-limited certifications requiring recertification at intervals of seven to ten years (American Board of Medical Specialties, 1999, p. 54). Although all member boards are now planning recertification programs, the 1994 conference proceedings still offer meaningful discussions of the complexity of implementing such programs and of measuring proficiency.

The conference proceedings suggested a four-step process to institute recertification. Outlined by Phillip G. Bashook, who is still the Director of Education and Evaluation for the

ABMS, the process includes defining the purpose of the recertification program, shifting the focus from initial certification to recertification, selecting what to assess, and selecting appropriate evaluation methods (Bashook, 1994). Although recertification may not apply to military neurosurgeons for reasons described later, the conference provides a meticulous and expert foundation on assessing surgical proficiency. Therefore, each aspect of the process is described below.

First, administrators of recertification programs can select one of two primary techniques. The program can recognize a physicians' continuing positive performance or screen out individuals performing significantly below standards (Bashook, 1994, p. 16). A process that recognizes continued achievement will focus on continuing medical education, involvement in professional associations, and the pursuit of excellence. The methods of evaluation may emphasize collaboration and be self-reported. In contrast, using recertification to screen out and identify outliers, focuses on minimum standards, secure evaluation methods, and the in-depth verification of deficiencies. Defining the focus is essential in overcoming issues such as designing the examination and expected failure rate, withstanding legal challenges, and building support for the largely voluntary program. The focus or objective of the program is manifestly tied to what is considered success. A Canadian study, for example, focused on minimum standards for the renewal of family practice licensure. After completing an extensive written and oral examination, audit of patient records, and standardized patient review, the failure rate was 0.5 per cent. When analyzing the results, the administrators questioned if the remarkably low failure rate justified the time and money spent on the process (Gerbie, 1994, p. 98).

The second step in the recertification process is to acknowledge the difference between initial certification and recertification. A physician applying for recertification has been a board

certified specialist for at least seven years. That physician has had significant time to develop an individualized practice and set of unique experiences. This is notably different from certification, as Bashook explained, “In initial certification there is a strong dependence on the information collected and verified by residency training directors who have firsthand experience with the board applicant” (Bashook, 1994, p. 18). Recognizing that post-residency physicians are not guaranteed similar experiences and are difficult to compare is essential in designing a recertification program. Assessing competency requires a comprehensive evaluation. Metaphorically, Bashook describes it as a “videotaped assessment over years of practice” rather than a “snapshot” (Bashook, 1994, p. 19).

The third step is to select what to access in order to ensure content validity of the evaluation or recertification program. Bashook suggested a list of categories of clinical expertise. Table 1 describes, in paraphrase, this list.

Table 1

Potential Categories of Clinical Expertise for Recertification Programs

1.	Mastered the medical knowledge specific to specialty.
	The candidate is informed about current medical literature.
	The candidate demonstrates practical knowledge based upon experience.
	The candidate recognizes personal limits of knowledge and abilities.
2.	Demonstrates clinical reasoning ability consistent with experienced experts.
	The candidate can recognize important patient care issues in complex clinical problems.
	The candidate’s employees use accepted problem solving techniques.
	The candidate employs efficient, reliable, valid, and economical methods to gather

essential patient data through history, examination, and texts.

The candidate can manage expeditiously critical incidents encountered in specialty.

3. Demonstrates proficiency in employing surgical techniques and using medical equipment for diagnosing and treating diseases considered at the core of the specialty.

   The candidate can perform routine surgical procedures typically used in specialty.

   The candidate can demonstrate consistently successful outcomes for surgical patients.

4. Demonstrates proficiency in diagnosing and treating patient within their specialty.
5. Demonstrates the use of appropriate interpersonal relationships when interacting with patients, families, physicians, and other health professionals.
6. Demonstrates expertise and confidence in managing difficult clinical cases referred to them, especially when there is insufficient data or uncertainty about treatment options.
7. Demonstrates a commitment to life-long learning to ensure continued competence.

For comparison, categories of evaluation tools are described in an article by Paul G. Ramsey at the University of Washington. Table 2 lists those assessment categories used in a peer review of board certified internists. This set places more emphasis on interpersonal skills. The results of the study showed that peer rating was a highly effective method of evaluation (1994).

Table 2

Assessment Categories Used in Peer-Reviewed Studies

Cognitive and Clinical Management Factor	Humanistic Factors
Medical Knowledge	Respect
Ambulatory Care Skills	Integrity
Management of Complex Problems	Psychosocial Aspects of Illness
Management of Hospitalized Patients	Compassion
Problem Solving	Responsibility
Overall Clinical Skills	

The fourth step is to select an evaluation method or methods. More precisely the task is to select evaluation methods that accurately capture data of the categories to be assessed and then implement that method in a reliable and cost-effective manner. There are numerous testing methods that vary greatly in style, length, and cost. Methods include written examination, computer based assessments, oral examinations, reviews of audits of records, and observations of performance. A table describing methodologies in found in Appendix A. The trade off is obvious, efficiency versus effectiveness. A detailed review of physicians by a panel of experts may yield the most valid and in-depth understanding of the physician's competence. Such methods are costly and time-consuming and therefore, unpopular. A practice review conducted by the orthopedic specialty board costs the applying physician $9,600. When this practice review was offered as one option, as opposed to a written exam, only two physicians out of hundreds of candidates selected this method (Kettlekamp, 1994, p. 55).

When selecting evaluation methods, Computer Based Assessment deserves special consideration because of the high expectations of technology. Computer programs offer interactive evaluation methods such as programs that test the management of a patient's care by simulating feedback from treatment choices. However, the cost of developing such programs can be deceptively high and is endured, at the start, by the evaluators (Lunz, 1994, p. 135).

Notably, peer rating deserves special comment. A doctor's reputation and the respect earned from peers are a traditional method of evaluating physicians (Ramsey, 1994, p. 76). They have also been used as an integral part of determining clinical privileges, completing performance appraisals and determining compensation. A formal peer rating process can be meaningful and consistently statistically valid in terms of inter-rater reliability. Moreover, peer rating can be an acceptable method to physicians. In one survey of 263 physicians 84% agreed that peer ratings should be used in credentialing and recertification (Ramsey, 1994, p. 77).

The key point drawn from the experts gathered by the ABMS is that while the continued evaluation of physician recertification is critical, it is extremely difficult. Mancall notes, "Still, after more than half a century, fundamental questions continue to be raised as to how best assess the experienced clinician" (Mancall, 1994, p. xii). Military neurosurgeons and other specialist may not face recertification during their military careers, however, the preceding discussion provides a framework when considering the complexities of evaluating proficiency.

Patient Volume

As acknowledged by the ABMS in the above discussion, part of the difficulty in evaluating proficiency is the difference in physicians' practice styles. Due to a unique set of preferences and situations, the number and type of patients and ailments a physician sees could be different. However, repetition, both individual and institutional, has a tremendous impact on

positive outcomes. In a well-known study by Luft, Bunker, and Enthoven (1979), an inverse relationship between volume and mortality was established in procedures including open-heart surgery, vascular surgery, and coronary artery bypass graft surgery. Hospitals in which 200 or more of such cases were done annually had death rates 25 to 41 per cent lower than hospitals with lower volumes after adjusting for case mix. Their results supported the value of regionalization for certain operations. Studying the casual link between higher volume and improved outcomes, Luft, Hunt, and Maerki (1987) validated two potential explanations; the self-explanatory practice-makes-perfect hypothesis and the selective referral hypothesis where more patients seek out settings with better outcomes.

Numerous studies have reaffirmed the inverse relationship between volume and outcomes. The advances in information technology and the proliferation of health information databases have allowed studies to increase in the sophistication of case-mix adjustment. For example, a study of pediatric cardiac surgery in 16 acute care New York hospitals concluded that both hospital volume and surgeon volume are significantly associated with in-hospital mortality for high-complexity and low-complexity pediatric cardiac procedures. Surgeons with annual volumes of fewer than 75 cases had significantly higher mortality (8.77%) than surgeons with annual volumes of 75 or more (5.9%), a greater than 45% increase (Hannan, Racz, Kavey, Quaegebeur, & Williams, 1998). This study used the New York's Cardiac Surgery Reporting System in order to obtain the detail patient data necessary for risk-adjustment.

In May 2000, a workshop interpreting the volume – outcome relationship was conducted jointly by the Institute of Medicine's Committee on Quality in Health Care in America and the National Cancer Policy Board. The published results described a systematic review of hundreds of studies published since 1980 as well as the consensus of a wide range of experts. The review

of literature carefully selected 88 studies concerning eight procedures or conditions. A statistically significant association between higher volume and better outcomes was found in 79% of the studies of hospital volume and 77% of the studies on physician volume. Additionally, the 16 studies judged to have the soundest methodology all showed a statistically significant relationship (Hewitt, 2000).

The workshop participants reached the consensus that volume is imperfect but "may be the best available proxy indicator of quality for certain conditions (Hewitt, 2000, p. 1)." The potential uses of information on the volume-outcome relationship include guiding consumer decisions, designing insurance benefit packages, distributing resources and issuing Certificate of Need legislation. Especially relevant to surgical proficiency, the workshop participants also identified medical education, credentialing, accreditation, and board certification as areas benefiting from the proven relationship between volume and outcomes. The use of this information, however, must be tempered with other quality indicators and a detailed examination of the variables. Exceptions, such as a low-volume surgeon with high-quality outcomes, are frequently noted in the studies. As the workshop summary repeatedly emphasized, "it is difficult to isolate the factors responsible for the volume-outcome relationship"(Hewitt, 2000, p. 7). Numerous physicians, clinical specialists, and processes of care are involved in the treatment of patients.

Additionally, the methodologies use to account for the differences in patients, the risk-adjustment, are not consistent. The authors of the systematic review of literature believed that administrative data such as age and gender were inadequate, detailed clinical data specific to the disease or condition under study was needed to gain the provider's confidence in the performance reports (Hewitt, 2000). The detailed clinical data required is not commonly collected across

hospitals or health systems. More to the point, the authors of the literature review stated the "methodological rigor of the studies [was] modest" (Halm, Lee, & Chassin, 2000, p 28). For example, only 4 of the 88 selected studies adjusted for differences in processes of care and only 2 addressed the appropriateness of patient selection (Halm, Lee, & Chassin, 2000, p. 28). The challenges to risk-adjusted studies must be considered relative to the challenges and complexities of monitoring quality outcomes and evidence-based practice. Therefore, volume as a proxy for quality is promoted and is being used.

An important shift has occurred in the study of outcomes. Consumers, both patients and payers, have identified volume as a criterion in referrals. A study published in the Journal of the American Medical Association identified 11 procedures, such as heart transplantation, cerebral aneurysm surgery, and care and esophageal cancer surgery, with well-established research linking high volume hospitals and low mortality. The research examined the discharge patterns in California for 1997 and determined that 26% (602 out of 2,273) of the deaths for these 11 procedures were attributable to referrals to low-volume hospitals (Dudley, Johansen, Brand, Rennie, & Milstein, 2000). Attributing an actual number of deaths in one year to the method of hospital referral is eye-catching to the healthcare consumer. The California study by Dudley et al. is cited by the Leapfrog Group as further justification for their patient safety initiatives.

The Leapfrog Group is a non-incorporated, independent organization sponsored and funded by the Business Roundtable, an association of Fortune 500 Company CEOs. The Leapfrog group advocates using the power of major healthcare purchasers to encourage hospitals to adopt proven quality standards. At its initiation in November 2000, the Leapfrog Group boasted over 60 companies, including Boeing, Ford Motor Company, and General Mills,

representing 20 million Americans and 40 billion in healthcare dollars (The Leapfrog Group, 2000).

The Leapfrog Group has selected three patient safety standards as criteria for purchasing healthcare from a hospital; a Computer Physician Order Entry (CPOE) system that automates the process a physician uses to order medicine; staffing for intensive care units that includes providers trained and certified in critical care; and evidence based hospital referral for complex procedures where hospital volume has been scientifically linked to outcomes.

In discussing volume as a component of physician proficiency, it is important to note that the Leapfrog Group has limited evidence based hospital referrals to the volume and outcomes experienced by hospitals, not individual surgeons. Also, the criteria are limited to risk adjusted outcomes in geographical areas that publicly report such information or to an annual hospital case volume in only seven specific procedures. Of these procedures, for example, a hospital must complete at least 500 coronary artery bypasses per year to quality for referral for a participating health plan.

Also relevant to this research is the methodology by which the Leapfrog Group selected the safety standards to implement. As described on the Leapfrog Group web site, four questions identified the selected patient safety criteria as suitable initiatives: Is there scientific evidence these standards would significantly reduce avoidable danger? Is their implementation by the health industry feasible in the near term? Can consumers readily appreciate their value? Can health plans, purchasers, and consumers easily ascertain their presence or absence in selecting among health care providers? (Leapfrog, 2001) Such criteria is useful when selecting metrics and applying the results to business decisions.

The inverse relationship between high volume and poor outcomes is clearly established in the 1979 study by Luft, Bunker, and Enthoven and in the 2000 report by the Institute of Medicine. However, the lower mortality at high-volume hospitals does not simply reflect more skillful surgeons. All aspects of care including selective referral, anesthesia, and postoperative care, play a part. Intuitively greater experience improves individual surgical skills, a critical part of maintaining proficiency. But it is important to note these studies have focused only on specific, high-risk, and high-cost procedures. In the Institute of Medicine's review of literature discussed above, neurosurgery was considered by the researchers but excluded due to the limited number of volume-outcome studies in that specialty (Halm, Lee, & Chassin, 2000). Again, understanding a surgeon's skill in the entire scope their practice requires a focused look at that surgeon.

Quality Management

A full discussion of quality management is beyond the scope of this literature review. It will suffice to note that the general trend of quality management, quality assurance, and other departments with related functions have moved from a philosophy of regulatory compliance to one of continuous improvement, strategic objectives, and a reduction in variation. Since the 1970's, risk management, utilization management, and quality management have become "increasingly purposeful, demonstrating value-added benefit to hospitals facing managed care competition, cost containment, and a litigious environment" (Youngberg, & Weber, 1997). That description, emphasizing the increased value of quality management to healthcare organizations, is an important foundation for a discussion of provider proficiency. Only two specific points will be made at this time. The credentialing and privileging process relies upon a substantial review of a provider's skills, knowledge, and abilities by a team of experts. Second, the Joint

Commission on the Accreditation of Healthcare Organizations (JCAHO) survey emphasizes continued improvement and mandates that physician privileges be reviewed every two years.

Credentials and Privileges

The credentialing and privileging process will be considered together for the sake of this discussion. They are part of the same established process of evaluating physicians at the health care organization. In accordance with the Comprehensive Accreditation Manual for Hospitals (CAMH), the following definitions of the previously mentioned terms are provided:

> Credentialing – the process of obtaining, verifying, and assessing the qualifications of a health care practitioner to provide patient care services in or for a health care organization (CAMH, 2001, p. MS-7).
>
> Privileges – authorization granted by the appropriate authority (for example, governing body) to a practitioner to provide specific care services within well-defined limits (CAMH, 2001, p. MS-2).

The credentialing process ensures an applying physician has the appropriate professional and legal documents for membership in a health organization. It generally refers to the initial review of a newly employed physician. Privileging refers to evaluating the clinical competence of a physician to formally determine which procedures that individual is authorized to perform. The modern process of reviewing credentials and granting privileges is well-established tracing back to programs such as the 1915 Hospitalization Program of the American College of Surgeons. As medicine became more specialized and more regulated, the number of documents and scrutiny of the credentialing process grew, as did the level of detail necessary for the granting of privileges. A critical concept for this study, however, has remained constant: The best evaluator for a physician is another physician. In these processes the duty falls upon the hospital

medical staff to not only review external standards such as licensure and board certifications, but to also conduct performance assessments, practice reviews, and observations. The importance of this duty was clearly stated by William Jessee, a contributor to the ABMS collection of essays on hospital privileges, “There is perhaps no single responsibility of the hospital medical staff which is of greater gravity than that of assessing, monitoring, and continuously improving the quality of the care provided in the hospital” (Jessee, 1992, p. 19).

As noted by Donald Langsley in an essay published by the ABMS, it is comforting to the Credentials Committee to rely on national standards rather than to defend their individual judgment (Langsley, 1992, p. 67). Thus the importance of licensure, board certification, and even board eligibility is reaffirmed. Licensure reflects a set of minimum standards established to protect the public safety. Board certification reflects a set of higher standards and professional development. In addition, a wide range of the physician’s personal record and hospital quality management data is correctly used in the credentialing and privileging process. Indeed, the use of Quality Management data is mandated by JCAHO standards, by court opinion, and more importantly, by common sense (Beauregard, 1992, p. 39). Defining the common elements of Quality Management as Quality Assessment and Improvement, Risk Management, Infection Control, and Utilization Management, information from all of these offices are used in credentialing. Generally, the onus for establishing clinical competence during provisional status and reappointment rests with the applicant. Nevertheless, a wide range of Quality Management data obtained by the hospital both aggregate and provider-specific should be considered thoughtfully. For example, checking the National Practitioner Data Bank for a record of legal claims paid by the applicant is practical retrospective Risk Management data. However, the use of this data must be tempered with thoughtful consideration. The National Practitioner Data

Bank lists all legal claims paid by the physician, even nuisance suits and legally expedient claims paid against the physicians wishes.

JCAHO

Since 1965 the JCAHO has had formal government recognition as an alternative to government certification thus becoming a gatekeeper to Medicare funds and the standard bearer in hospital quality. The Army Medical Department has committed itself to obtaining JCAHO accreditation for all its hospitals. These two facts make the accreditation process is a significant principle in the discussion of surgical, and specifically neurosurgical proficiency. Since they apply to all areas of healthcare delivery and a wide range of healthcare organizations, the scope of JCAHO surveys far exceeds the analysis of a specific medical specialty. However, literature reflecting the current philosophy of the JCAHO survey and a description of selected standards may facilitate this discussion.

Since 1996, in their Agenda for Change, JCAHO standards have been organized by functions and emphasize organizational quality improvement. Using the term improvement of performance, the approach to conducting surveys shifted from a regulatory approach to a more congenial partnership in which the hospital is encouraged to demonstrate on-going or continuous efforts to improve care to its patients. Therefore, those designing quality management have an increased need to ensure that their programs are organizational wide and interdisciplinary, and designed to evaluate processes in clinical services, management, and governance (Meisenheimer, 1997, p. 35). The concept of continuous improvement is reflected in the increased number of surveys, the use of unannounced surveys, and the language describing the standards in their Comprehensive Accreditation Manual for Hospitals.

The two areas of the JCAHO survey most relevant to neurosurgical proficiency are standards bearing on Medical Staff and the Management of Human Resources. Standards, such MS.5 concerning the credentialing process, MS.7 concerning continuing medical education, and HR.3 concerning the assessment of competence in all staff members, have specific elements to be scored (1 to 5) during the JCAHO survey. A review of the standards reaffirms that the evaluation of physicians is, at its core, a local function best conducted by physicians' peers. The medical staff, for example, is charged by the JCAHO manual with "participating in ongoing [measurement], assessment, and improvement of both clinical and non-clinical processes and the resulting patient outcomes" (1999, MS-1) and "continuing surveillance of the professional performance of all individuals in the department who have delineated clinical privileges" (1999, MS-6). As a relatively recent change, it is important to note that a review of privileges for each physician is required every two years. Additionally, the JCAHO recently stated that audited patient records would be selected randomly and not selected by the hospital. Perhaps, these actions were in response to a 1999 Health and Human Services Report that was critical of JCAHO for its move away from strict, regulatory evaluations. The report found that a major deficiency of the JCAHO process was that is was unlikely to detect substandard patterns of care or practitioners with questionable skill due to the "quick paced, tightly structured, educational oriented surveys" (1999, p. 2).

Army Medical Department

Overview of Military Medicine

The intended audience of this study is familiar with the AMEDD. But, in order to provide continuity in this research effort, a brief description is provided. The AMEDD is one of the world's largest medical systems with two million eligible beneficiaries. The organization

includes 8 medical centers, 28 hospitals, and numerous clinics. The AMEDD has resources and expertise that support worldwide missions in medical care, research and development, preventive medicine, dental care, and veterinary medicine. AMEDD personnel include approximately 24,000 soldiers, 23,000 civilian employees and another 20,000 active duty medical soldiers in other commands and tactical units. Additionally, 65 percent of Army medical resources are in the Reserve Component. In a posture statement given to the United State Senate subcommittee, the Army Surgeon General, LTG Peake, framed his comments in "three fundamental components of our mission; Projecting a Healthy and Medically Protected Force; Deploying a Trained and Equipped Medical Force; and Managing the Health of Soldier and the Military Family" (Peake, 2001).

The balance between wartime readiness and peacetime healthcare are interwoven in these fundamental components. The quality of the peacetime healthcare provided by the AMEDD compares favorably to the civilian standard. Pertinent to this discussion is the fact that all Army hospitals are accredited by the JCAHO and exceed the average score of civilian hospitals, and 88 percent of Army physicians who have finished residency have passed board certification exams, versus 79 percent of primary care physicians and 82 percent of specialists in civilian health maintenance organizations (Noyes, 1998).

The military drawdown in the early 1990's created a shortfall of medical services that required arranging civilian healthcare for beneficiaries. The drawdown reduced the AMEDD by 34.5 percent but eligible beneficiaries only declined by 13 percent (Peake, 2001). Managed care contracts known as TRICARE, began in 1995 at Madigan Army Medical Center in the Northwest Region and are now fully operational throughout the Defense Health System. TRICARE expanded to include senior retirees at certain demonstration sites (TRICARE Senior Prime) as a

Health Care Financing Agency approved Medicare + Choice plan. The 2001 National Defense Authorization Act will again expand and improve care provided to military retirees. In TRICARE for Life, TRICARE becomes the second payer for Medicare and also expands the pharmaceutical benefit to retirees over 65. In effect, this legislation greatly expands the beneficiary population served by the contracted healthcare network and, potentially, the military treatment facilities. This is relevant to neurosurgical proficiency in that there is great potential for changing the beneficiary population served directly by the military facilities, therefore increasing the case-mix and volume of procedures.

In his testimony to Congress in February 2001, LTG Peake lauded numerous initiatives at Army facilities that increased the efficiency and effectiveness of Army Medicine. Among the efforts cited were investments at Walter Reed Army Medical Center (WRAMC) designed to increase support staff ratios (from less than 1 to more than 2), and to increase salaries for civilian nurses in response to the competitive market. The increased support staff was designed to improve GME by increasing the volume and complexity of cases the departments could accept. The testimony reports initial success by a 7% increase in case mix index and a 10% increase in inpatient workload (Peake, 2001).

The Army Surgeon General continued to emphasize the central role of quality healthcare professionals; “We need additional incentives and benefits to attract and retain quality people. Most importantly, the quality of practice that comes from adequate support staff, quality facilities, and a full spectrum of patients where the patient is the focus of the effort are the factors that will attract and keep our quality people on our team” (Peake, 2001). He then addressed the fact that special pay rates for physicians have remained fixed since 1990. These two concerns, pay and support services, are not new to the Medical Corps or to military medicine. They have

been frequently cited as primary reasons for job dissatisfaction and transition out of the military. For example, a 1993 survey of 1,300 military physicians cited pay, clerical support staff, and the inability to influence local policy as the three least satisfying elements of their career (Kravitz, Thomas, Sloss, & Hosek, 1993). A recent study by the Center for Naval Analysis was prompted by a decline in retention for the majority of medical specialists in the Navy. After 300 interviews with physicians, pay, inadequate administrative staff, and the lack of recognition as professionals were among the top dissatisfiers (Brannman, Rattelman, & Schutte, 2000). A complementary study by the Center for Naval Analysis examined the difference in compensation between Navy physicians and their civilian counterparts. The results showed that "…the current compensation of uniformed services ranges from 12 percent below the median private sector for family practice to 48 percent below for orthopedic surgery at the 7-year-of-service juncture" (Brannman, 2000, p. 3). The report's data showed neurosurgery was 33 percent below the median compensation at 7 years-of-service, 53 percent below, the highest disparity, at 12 years-of-service, and the only specialty in which the net present value of the compensation, including retirement, was still below (-3%) the median private sector compensation at 17 years-of-service. A similar study has been completed for the Army and Air Force but the distribution of the results is limited until it is presented to Congress. However, the data will closely resemble the wide gaps seen in the Navy (S. Bannman, personal communication, 21 March 2001).

Military Neurosurgeons

The Army has 26 authorizations for neurosurgeons. Currently 19 are fully qualified, 6 are in Graduate Medical School, and 1 authorization is vacant. Neurosurgeons are distributed to seven of the eight Army Medical Centers but concentrated at WRAMC. Tracing its history to World War II, the neurosurgical residency program at WRAMC is the last such program in the military.

The staff of five board certified Army neurosurgeons is supplemented by Naval neurosurgeons assigned to the National Naval Medical Center in Bethesda, Army Reserve physicians, and coordination with the civilian network. As one of the smallest specialties in the Medical Corps, the issues of recruitment and retention are especially important. The vacancy of one authorization will impact or eliminate neurosurgery services at a medical center. Therefore, the Surgeon General's comments concerning pay, support staff, and retention are especially important to this exploration of proficiency.

Summary

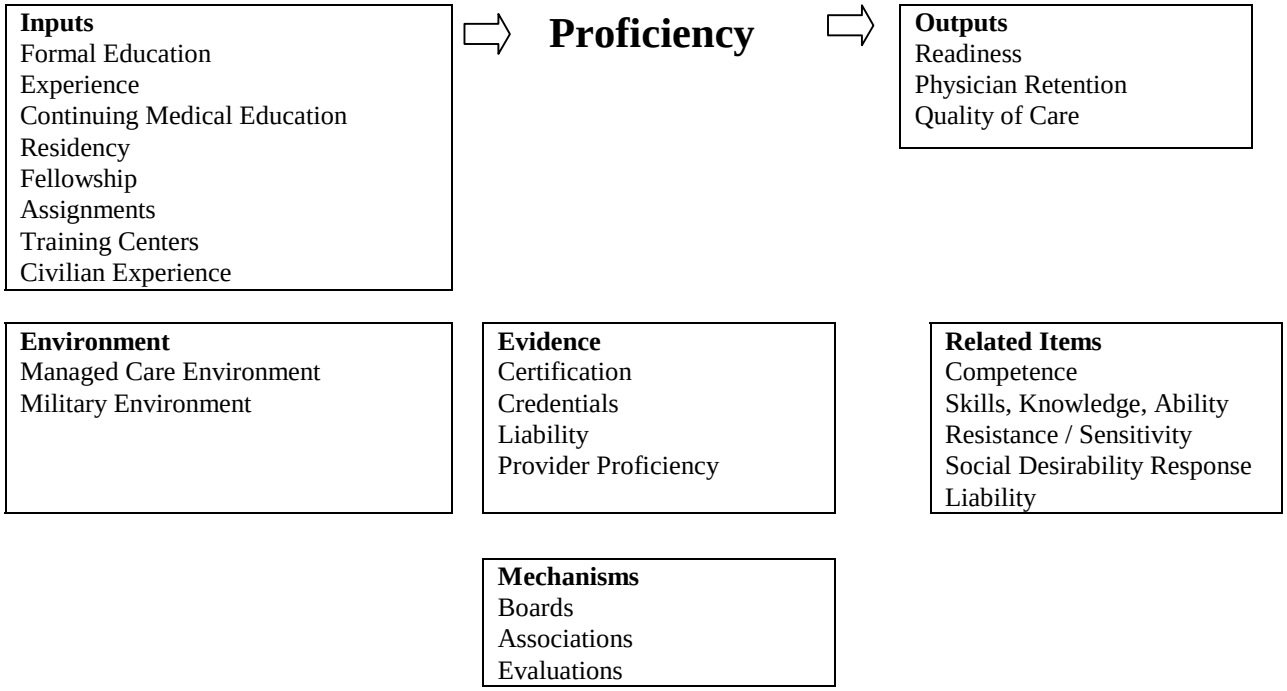
The preceding literature review considers surgical proficiency but does not adequately define surgical proficiency. A complete list of the concepts impacting provider proficiency or the evaluation of human behavior or competence is undefined and thus can not be covered. The preceding discussion, however, is a sufficient base with which to begin the research -- exploratory research -- into the proficiency of military neurosurgeons. Several key points should be carried forward. Foremost, the healthcare industry is actively engaged in the struggle to define, measure, and improve the proficiency of healthcare professionals. In a broader sense, modern industry has refocused on intangible or intellectual assets. A new emphasis is on human resources management to accomplish the strategic goals of the organization. Traditionally dependent upon intellectual assets, medicine has tremendous education and professional structures that develop physicians. Additionally, the technological advances in data collection, the development of quality management processes, and the scrutiny by purchasers increase the measurement of performance in healthcare. Nevertheless, certain things remain consistent, there is not a universally accepted measure of competency, only proxies, and gauging the competency of a physician is dependent upon a close inspection of that doctor's practice by other doctors.

Acknowledging those ideas, board certification by an ABMS member board is the national standard that demonstrates a level of surgical proficiency following the minimal legal standards required to practice medicine.

A model was drafted reflecting the major themes of this literature review. It is presented now, albeit imperfect, as it was a tool used to facilitate the collection of qualitative data (Figure 1.).

Figure 1

Proposed Conceptual Model of Neurosurgical Proficiency



Purpose

The purpose of this research project is to clarify the concept of provider proficiency in order to guide effective management decisions that measure and influence the performance of military neurosurgeons. The opinion and perspectives of numerous experts were collected in the hope that their dispersed views can be integrated. The results and findings of this research

project address three key issues. First, they will provide a detailed examination of neurosurgeons in the U.S. Army and their perceptions of proficiency, which could influence the decisions of the neurosurgical consultant. Second, this project gives a full understanding of the current and future trends in provider proficiency and the development of benchmarks. Finally, this project makes several recommendations for additional qualitative or quantitative research that the Health Policy and Services Directorate, USAMEDCOM may use to tie strategic plans into business actions for neurosurgery and other specialties.

Methods and Procedures

Overview

This project used qualitative research and analysis methods in order to explore and clarify the concept of surgical proficiency among U.S. Army neurosurgeons. Qualitative methods are appropriate for this topic because at the core of the issue is human behavior, experience, and perception. Qualitative research has been defined as " …modes of systematic inquiry concerned with understanding human beings and the nature of their transactions with themselves and with their surroundings…" (Benoliel, 1984, p. 3). This type of research refers to the methods and techniques of observing, documenting, analyzing and interpreting attributes, patterns, characteristics and meanings of specific, contextual, or gestaltic features of phenomena under study. Essentially, the goal of qualitative research is to document and interpret as fully as possible the totality of whatever is being studied, proficiency in the case of this study, in the context of respondents' viewpoints or frames of reference (Leininger, 1985, p. 5). The participants in this study are three primary groups or stakeholders: individual neurosurgeons, major command staff officers representing the Surgeon General, and the professional specialty organizations enforcing standards. Examining quantitative data alone, such as the frequency of

surgical cases, could woefully understate the complexity of the issue. In this study, quantitative data was used to describe the context of the problem. Ultimately, this research may support the development of valid quantifiable theories and models. The purpose of this research is to clarify concepts through the collection of qualitative data and the use of qualitative analysis.

Data Collection

This project collected data in two phases of interviews. The first phase included interviews with a wide-range of experts who have different interests and perspectives of the topic. The purpose of the first phase was to clarify the concept of proficiency, better understand the practical use of proficiency or competency metrics, and refine the subsequent interviews. The first phase consisted of focused interviews containing open-ended questions. This interview structure was designed to encourage conversation and explore varied and new perspectives (Polit & Hungler, 1993, p. 201). The Phase I focused interview schedule and the list of interviewees is contained in Appendix B. Twenty-three interviews with 3 senior military surgeons, 14 senior military staff officers, and 6 representatives from professional societies were conducted in the first phase. The second phase consisted of a semi-structured interview schedule containing both open-ended and closed-ended questions. The participants were nine fully qualified active duty neurosurgeons from a population of nineteen neurosurgeons currently in the U.S. Army. This phase of the interviews was designed to gain understanding about the proficiency within the neurosurgical specialty and to collect specific information that can be tallied and compared through analytical methods. The Phase II interview schedule is listed in Appendix C.

In addition to the interviews, quantitative data were integrated into the research project. Advocates of the multi-method approach suggest, “many areas of inquiry can be enriched through the judicious blending of qualitative and quantitative data” (Polit & Hungler, 1993, p.

334). Germane to this project was the advantage of quantifiable data complementing the anecdotal evidence with the descriptive statistics of workload and case mix. Numerical or graphical data could illustrate critical points in a way that stimulates conversation and may ultimately facilitate the transition from qualitative research to quantitative business metrics. Longitudinal, ex post facto data was downloaded from the Standard Inpatient Data Record (SIDR). This data was downloaded directly from the SIDR data warehouse through the Executive Information and Decision Support (ED/IS) contractors located at the TRICARE Management Agency in San Antonio, Texas.

Characteristics of Qualitative Methods

Qualitative research refers to the methods and techniques of observing, documenting, analyzing and interpreting attributes, patterns, characteristics and meanings of specific, contextual, or gestaltic features of phenomena under study. Essentially, the goal of qualitative research is to document and interpret as fully as possible the totality of whatever is being studied, proficiency in the case of this study, in the context of respondents' viewpoints or frames of reference (Leininger, 1985, p. 5). The people in this study are three primary groups or stakeholders: individual neurosurgeons, major command staff officers representing The U.S. Army Surgeon General, and the professional specialty organizations enforcing standards.

Because of the complexity of human phenomena in complex organizations, the qualitative research method is gaining increased prominence to more richly describe the human experience. More and more, granting agencies are asking for proposals to include a "qualitative component" (Morse, 1997, p. 2). The presentation of qualitative research is always an art because of the difficulty of compressing descriptive information without losing the rich description and essence of the message. In the qualitative portion of this study, the principal

investigative tool is the data collection instrument and the surgeon is the unit of analysis. The interview questions are the tools or mechanisms through which interview responses are stimulated. The interview data gained in this study will be subjected to content analysis to search for themes and patterns.

Qualitative researchers believe that there is more to knowing people than what can be seen, sensed, and measured. Tools for investigation include interviews, such as the one designed for this study of provider proficiency in a managed care environment. Reliability and validity of a tool such as an interview are estimated by specific measures tailored for qualitative research. Validity of the interview is established by having an expert determine the face validity of the interview questions. Reliability is estimated by conducting member checks for confirmability. That is, asking the interviewees to review a typed narrative of their responses to determine the accuracy and completeness of the transcript (Leininger, 1985, p. 15).

Reliability, Validity, and Quality of Qualitative Data.

The qualitative data used in this project were collected by a single researcher. This fact helped to eliminate questions of inter-rater reliability and minimize inconsistency in the method of data collection. However, the purpose of the interviews was to encourage conversation and collect varied opinion. In this regard, subject response variation was desired. To assist the reader in appropriately critiquing this research, detailed information concerning the interviews will be listed in this section and in the body of the discussion. Approximately half of the interviews in the first series were conducted by telephone. These interviews lasted, on average, about an hour but ranged from 30 minutes to 2 hours. All interviews in the second phase were conducted by telephone and consistently lasted 20 to 30 minutes. Electronic communication was used to facilitate the discussion by sending advanced copies of the questions or illustrations of

quantifiable data. Open-ended questions were guided by a focused interview schedule developed after the literature review. The interviews in the second phase were guided by a semi-structured interview schedule. Those questions were developed after careful analysis of the first series of interviews. In order to allow reliable comparison, adherence to the interview schedule, especially during closed-ended questions, was followed to the greatest extent possible.

The greatest threat to the reliability of the interview data is social desirability response bias. This refers to the fact that some people tend to respond in a manner that is "consistent with prevailing social views" (Polit & Hungler, 1993, p. 213). This is compounded by the sensitivity of the subject matter. The concepts of proficiency or competency have serious implications in healthcare; not the least of which is the threat of adverse legal action. Asking a surgeon to self-report on the state of his or her professional proficiency is obviously a misguided approach, even to the most naïve researcher. The questions used in the second phase were be selected carefully and recognize the sensitivity of the topic. As an additional defense against social desirability response bias, Phase II interview responses were kept in strict confidence; names were not tied to responses and the data were presented in a consensus of opinion.

Reliability, Validity, and Quality of Quantitative Data.

Evaluation of the quantitative data addresses reliability, validity, and quality. Data reliability concerns the consistency of the data throughout the set. The data for this project were extracted from the Standard Inpatient Data Record (SIDR) warehouse. The data for this project concerned all Army Military Treatment Facilities, however, all sites use the SIDR data collection system and corporate procedures. Data validity concerns the relevance and appropriateness of the data. In this project the quantitative data is used to complement the qualitative data. This research presents only basic data elements, such as the frequency of

specific procedures. Finally, data quality, the accuracy of the data input and data elements, is perhaps the greatest concern for research in the Army Medical Department. Researchers must recognize the limitations of the data being collected. Significant issues concerning the data quality remain. However, the Patient Administration Systems and Biostatistics Activity (PASBA) has consistently reported improvements in data quality. The SIDR data requested for this project may vary from facility to facility. However, the data overwhelmingly satisfies the quality metrics set by PASBA. For example, in the last month of posted quality metrics, July 2000, 34 of 35 facilities reported 99%-100% SIDR timeliness. Although the quality of previous years will vary, the data may be used with confidence for the scope of this project.

Ethics

The most important ethical consideration in this project is the acknowledgement that provider proficiency is a serious and sensitive topic. Many other ethical considerations can be addressed quickly. The use of patient names is not necessary and will be removed from the data, and this research does not involve experimentation or research subjects. As noted above, unless specific authority is given for a quote, information from the second phase of interviews will remain aggregated and opinions will not be attributed to a name. The responses of the first phase of interviews however are designed to gather expert opinion. Interviews will be conducted in a forthright and professional manner from volunteers. As generally accepted in business research, oral consent was obtained through the execution of the interview schedule (Cooper & Schindler, 1998, p. 110). The interviewees' participation acknowledged their agreement. All informants were provided the opportunity to verify the interpretation of their comments and to verify direct quotes. Throughout the research, the sensitively of this subject matter remained paramount, especially in the representation of conversation and opinion.

Results

The data collection reaffirmed the complexity that surrounds assessing proficiency in healthcare. During an interview with Dr. David Nahrwold, the Chair of the Task Force on Competence, ABMS, he cited his article in which he wrote, "To truly certify that a physician is competent is not possible right now. We cannot even precisely define physician competence" (Nahrwold, 1999, p. 592). However, there have been developments since that article was published. In response to increased demand from consumers and increased technology, the profession of medicine is slowly evolving the means to accurately define and measure competence.

Like the literature review, each interview could easily and rightfully expand the topic pursuant to that individual's perspective. There was consistent agreement, however, on the importance of understanding and improving surgical proficiency. And, while the healthcare system remains sound, there was consistent awareness of the undefined threat to surgical specialties. As Dr. Deal the JCAHO Administrator for the MEDCOM said, the military physician has "intensely scrutinized credentials" and the hospitals "consistently score higher than civilian counterparts and other services" (personal communication, 13 December 2000). A more granular examination of neurosurgery, however, revealed reason for concern. The findings will first address the expert opinions on the concept of proficiency and the trends in assessing surgeons. Then the findings will turn a more critical eye on neurosurgery.

Phase I Interview Findings

The key points from the interviews were consistent with the draft conceptual model (Figure 1), meaning that few topics were added or omitted. In general, the interviews noted that the formal educational process of medical school and residency is well-established. The input to

a surgeon's proficiency then turns to his or her experience. Following the formal education, the credentials and privileging process is the most often cited means to assess a physician's performance. The nationally accepted evidence, albeit a proxy for proficiency, is board certification. The outputs of provider proficiency in the draft model were readiness, physician retention, and quality of care. When discussing the concept of proficiency the interviews emphasized the quality of care as an output, specifically outcomes measurement. When discussing neurosurgery in the Army, the interviews emphasis was clearly on retention. Several issues raised in the interviews help conceptualize physician proficiency and refine the conceptual model.

Continuum of Education:

The single most important finding on the concept of proficiency is the idea that "the whole paradigm is changing to a continuum" (Dr. Karen Guice, personal communication, 15 December 2000). The Liaison Committee on Medical Education (LCME), the Accreditation Council for Graduate Medical Education (ACGME), and the ABMS are coordinating their programs to create consistent goals and consistent methods for evaluating physicians. In his role as the chair of the ABMS' Task Force on Competence, Dr. Nahrwold has worked closely with senior representatives of the LCME and ACGME. He reported that the three groups are seeking to adopt the same model for assessing competency. The LCME, for example, has accepted four attributes of physician practitioners, altruistic, knowledgeable, skillful, and dutiful as a framework. The ABMS and the ACGME use a model with six general competencies, patient care, clinical science, practice-based learning and improvement, interpersonal skills and communication, professionalism, and system based practice (Dr. David Nahrwold, personal communication, 6 February 2001). Once these organizations approve a single theoretical model

for their education programs, a physician would be assessed using the same criteria throughout his or her career from medical school to recertification. Creating this continuum, along with advances in psychometrics and outcomes measurements, will strengthen the validity of board certification but it will be a long process. According to Dr. Nahrwold, in 10 or 20 years, the goal is to have board certification reach legal significance and be able to certify to the public that physicians are competent (Dr. David Nahrwold, personal communication, 6 February 2001).

Healthcare Trends

When asked how managed care, or TRICARE in the military, has impacted provider proficiency the answers were mixed. The Senior MEDCOM staff did not view TRICARE as the sole cause, or sole cause of a reduction in volume. Considering civilian trends, Dr. Sue Guice, the American College of Surgeons Director of Fellowship Departments, agreed that managed care was not responsible for a reduction in volume and did not recall any American College of Surgeons publication supporting that claim. There are fundamental changes to the delivery of healthcare. The Director of Health Policy and Services, USAMEDCOM, COL Steve Phurrough, dismissed TRICARE as the cause of lower inpatient volume and recalled increased technology, advanced pharmaceuticals, and an emphasis on early intervention saying, “We are thinking about healthcare, not doing healthcare” (personal communication, 1 March 2001). The only consistent point made by respondents about the impact of TRICARE was the findings that customer oriented standards, particularly the rules defining the radius a patient must travel for care, have reduced the referral of surgical patients to military medical centers.

Dr. Nahrwold explained another dynamic of managed care that impacts directly on this research project. He noted that managed care has had a well-published negative impact on the doctor-patient relationship but it has also had a positive impact: “It probably has not made

physicians more competent but it has forced them to think about outcomes and competence" (personal communication, 6 February 2001). There is increased consumerism in healthcare. The industry is facing more pressure from purchasers, such as the Leapfrog Group, and legislators responding to public demand. This pressure forces the healthcare industry to use technology and new methods to offer proof of competency.

Measurements

As noted in the literature review, the local evaluation by peers is traditionally the best method of clinical assessment. This was stated clearly by Dr. Guice, "People at the local level know what you can and can't do. They are the best to determine your competence" (personal communication, 15 December 2000). This idea can be reduced even more to individual self-assessment. Noting the subtleties of medical practice and the difficulties of evaluating outcomes, COL (Dr.) James Leech stated that, "All surgeons do their own outcomes assessment." He emphasized the personal drive that brought doctors through years of training continues to drive their desire for excellence (James Leech, personal communication, 14 February 2001). What then can, and should, the corporation use to measure proficiency?

The interviewees, civilian and military, turned to the credentialing and board certification process as the primary method a corporation has to evaluate surgeons. These processes are a proxy for competence but also serve as a structural quality tool, establishing minimal standards for acceptance into a healthcare system. The primary concern of the corporation is outcomes. COL Steve Phurrough stated, "Our job [at a corporate level] is not to say, 'is the provider competent?' but 'are the outcomes adequate" (personal communication, 9 March 2001)? LTC Kathryn Dolter was more colorful, "If you have bad outcomes but you went to Harvard, who cares if you went to Harvard" (personal communication, 5 February 2001). This idea was

repeated throughout the interviews; a healthcare organization must examine the outcomes not just the credentials of individual providers. However, selecting the most meaningful healthcare metrics was beyond the scope of the interviews. Reference was made to the various healthcare metrics accepted by the healthcare industry such as mortality rates, patient satisfaction, and groups of outcome measurements such as JCAHO Oryx measurements. Repeated comments were made, however, on three issues concerning measurements; outcomes, volume, and strategic planning.

Risk-Adjusted Outcomes

The idea of risk-adjusted outcomes earned special consideration from the interviewees because it is closely tied to measuring physician performance. "Risk adjusted outcomes involves controlling for patient-specific characteristics which are the confounding variables in the assessment of patient outcomes . . . if patient-specific characteristics are unmeasured, systematic error is introduced into the evaluation of inter-provider outcomes" (Dolter, 1995, p. 34). Ideally, this statistical process provides a clear evaluation of an individual's, team's, or hospital's performance that can be compared or benchmarked. In practice, however, this remains an intense process that is only applied to the most high volume and high cost procedures. COL Leech summarized the experience of many interviewees, "Everyone is talking about it [risk-adjusted outcomes] but my perception as a surgeon and as chief of a large medical staff, is that outcomes measurement as a routine part of individual practices is in its infancy" (personal communication, 14 February). COL Leech then added that neurosurgery, in particular, is difficult to analyze. Often the desired outcome of neurosurgery is relief of pain, which is not truly measurable, so the outcome of the surgery is left to the subjective evaluation of the surgeon and ultimately to the patient.

Volume

Similar to outcomes, examining volume or experience, as a proxy for competence, is particularly difficult for neurosurgery. Citing the large number of studies examining the relationship between volume and outcomes, experience can be called the "key to proficiency" although it is not a legal or JCAHO requirement (Kathryn Dolter, personal communication, 5 February 2001). Volume may be especially important to neurosurgery, which relies, to a great extent, on skill and manual dexterity. LTC Monacci, the consultant for AMEDD neurosurgeons, spoke directly to that point and said even a short absence from the operating room, perhaps due to a military training requirement, could adversely affect a surgeon's skills. He recalled a saying among neurosurgeons, "After one week of not doing neurosurgery you notice a difference, after two weeks your assistant notices a difference, after three weeks your patient notices a difference" (William Monacci, personal communication, date). This specialty must continuously practice their skills with the right number and the right mix of cases in order to maintain proficiency in the full-spectrum of neurosurgery. These concerns, as Dr. Guice noted, "…[parallel issues in] the practice of medicine in rural areas."

Despite the anecdotal evidence, no military interviewee was aware of a formal report on the lack of volume or its affect in the military. Additionally, low volume or lack of experience affects the entire system. From his position shaping policy, COL Phurrough clearly sees the systematic problem, "Low volume is not just a surgeon problem, not just a physician problem" (personal communication, 9 March 2001). Having conducted extensive research into risk-adjusted outcomes, LTC Dolter clearly articulated that "provider proficiency is very dependent upon ancillary staff and support staff " (personal communication, 5 February 2001). The critical

need for support and teamwork confounds the assessment of individual surgeons and is a key point addressed below.

Measuring the volume of specific cases, as a proxy for competence, is imperfect for it does not reflect the supervision or teamwork involved in the case, nor the number of other cases that call upon a similar set of skills. Dr. Piepgras, a Director of the American Board of Neurological Surgery stated that even the ACGME has backed away from trying to set numbers of required cases (personal communication, 1 March 2001). Although certain numbers of cases are required for accreditation of residency programs and the affiliation of hospitals, Dr. Piepgras explained,

> "We got away from saying you have to do 50 of these and 20 of these. Because many times you set minimums, and they become standards in themselves. That is not always a good idea. We got away from setting numbers but rather sufficient breath and depth. That is probably a better way to think about it."

While advising against strict requirements for specific cases, Dr. Piepgras is eminently qualified to describe a full and healthy neurosurgical practice. His expectation is for a neurosurgeon to experience 150 to 200 cases per year including a number of the more complex cranial cases. After a recent visit to the neurosurgical residency program at WRAMC, Dr. Piepgras had "serious concerns" about the low volume of neurosurgical cases given to military neurosurgeons which was described as 60 to 80 cases per year with very few of the complex cases. This concern is consistent with the views expressed by LTC Monacci who said clearly that the trend in surgical volume was down, especially in complex cases (personal communication, 21 February 2001). Citing a feasibility study of establishing a center of

excellence, LTC Monacci said a neurosurgeon should conduct 15 to 20 craniotomies for tumor, aneurysm, and AVM per year but Army neurosurgeons typically do three or four.

Strategic Planning

The final comments on measurements concern strategic planning. The interviewees were asked, "What can and should the corporation look at to improve provider proficiency?" Again, their emphasis was on the credentialing and board certification processes as the means to create a high-quality organization, and the emphasis was on outcomes as the means to prove the organization was delivering high-quality healthcare. Two interviews were conducted specifically to explore the link between individual surgical proficiency and organizational strategy by using the framework of the Balanced Scorecard strategic management system. Geoff Fenwick is a consultant from the Balanced Scorecard Collaborative who recently worked with not-for-profit healthcare organizations. Barbara Possin, the Director of Strategic Alignment at St. Mary's Duluth Clinic, has helped implement the Balanced Scorecard in her organization and is using it as a tool to facilitate JCAHO surveys. Described briefly in the introduction of this paper, the Balanced Scorecard is a strategic planning management system that is being implemented in the U.S. Army Medical Department (AMEDD). The Balanced Scorecard seeks to link strategic objectives and measurements, and captures data about intellectual and intangible assets (Kaplan & Norton, p. 18). The Balanced Scorecard requires looking at business from different perspectives. They include financial, internal processes, customers, and learning and growth perspectives.

Both interviewees were quick to differentiate between quality management and the balanced scorecard. Possin stated that, "the Balanced Scorecard is about operationalizing [sic] strategy. It is about doing the right things. Quality improvement is about doing things right"

(personal communication, 1 March 2001). Both interviewees were quick to say clinical that outcomes and provider proficiency are best measured at the point of delivery; and balanced scorecards can be created for that level of operation. These interviews added two very pertinent ideas to the discussion. The first is that reputation and image in the marketplace is the primary intangible asset of concern to the organization. In support of this assertion, organizations often select metrics such as the annual U.S. News & World Report ranking of medical facilities, the number of research grants or publications, and the competition for residency slots in their facilities. The second idea is that the physicians are viewed as customers of the organization. Mr. Fenwick described that healthcare organizations place the customer perspective at the top of their balanced scorecard and consider three customers. "They think about the end consumer who gets the care. They think about the insurance customer, the channels that bring patients to the hospital. And, very importantly, they think about the referring physicians" (Geoff Fenwick, personal communication, 28 February 2001). These ideas resonate with the interviews of senior neurosurgeons. LTC Monacci expressed concern for the reputation of military neurosurgeons and for Walter Reed's ability to attract sufficient applicants into the residency program (personal communication, 21 February 2001). Dr. Piepgras included good morale and professionalism as requirements for provider proficiency, a point he emphasized to Walter Reed after his visit (personal communication, 1 March 2001).

Army Neurosurgeons

The purpose of the first phase of interviews was to gain input from a wide range of subject matter experts. Several interviewees, however, spoke directly to the subject of neurosurgery in the Army. None of these findings reflect upon individual surgeons or attempts to assess their ability. This section will first describe the comments from LTC Monacci, the

neurosurgical consultant, and then integrate the comments from others that address problems in retention, assignments, and clinical support.

During the interview, LTC Monacci echoed statements he recently reported to the Army Surgeon General. He stated "…retention is the most important issue at present and must be addressed in order to continue to provide high quality neurosurgical care to our beneficiaries" (personal communication, 21 February 2001). Presently the Army has only 18 of 19 active duty positions filled and by 2003 LTC Monacci predicts that only 14 will remain. The neurosurgery residency program at WRAMC is now the only military residency site as the Air Force and Navy have closed their programs. The recent accreditation of the WRAMC neurosurgical program is a significant accomplishment and LTC Monacci lauds the program director, LTC Ecklund, and the increased support received from the WRAMC Commander. However, LTC Monacci has seen a reduction in the number of applicants and says the program will produce only one neurosurgeon per year. The causes of retention problems are low pay, poor ancillary support, and the "…impression [that] military medicine is imploding as a result of TRICARE" which speaks to the difficulty of providing meaningful assignments to specialists.

As noted by the recent report from the Center for Naval Analysis, military neurosurgical specialty compensation, including all benefits, falls significantly below median civilian pay. LTC Monacci described the pay as in the bottom 3% of neurosurgeons in America (personal communication, 21 February 2001). When asked about what the military can offer, LTC Monacci said, "The intangible benefits of military service wear pretty thin when you find out you are earning as much as your plumber to do neurosurgery." Combined with this disparity, is the overwhelming feeling that the neurosurgeons are not treated as professionals and do not have adequate administrative support. As noted previously, Dr. Peipgras recognized the low morale

among the physicians during his trip to WRAMC. Many other interviewees acknowledged that the feelings of low pay and poor administrative support are persistent problems in surgical specialties but did not qualify the problem, as did LTC Monacci. He cited examples such as surgeons that would forego the annual neurosurgery bonus in order to avoid an additional three months of military obligation (personal communication, 21 February 2001).

As stated previously, "provider proficiency is very dependent upon ancillary staff and support staff " (Kathryn Dolter, personal communication, 5 February 2001). Therefore, LTC Monacci expressed concerns on the inexperience of Operating Room Technicians or the lack of perioperative support as critical to the discussion of proficiency. He said, "the [operating room] OR [technicians] Techs come and go so quickly [that] none of them get proficient and it just slows down the operation"(personal communication, 21 February 2001). Then, he quantified it by saying the operations at WRAMC take 20 to 30% longer than those in comparable civilian organizations. Poor logistical support was also included in the discussion as a further distraction from the practice of medicine. Dr. Piepgras said "In all my years I never expected that my residents were down there to make sure they had a complete set of instruments" (David Peipgras, personal communication, 1 March 2001). But, it was a necessary requirement at WRAMC. Neurosurgery is very specialized in terms of the necessary equipment and ancillary support. Among his recommendations to the Army Surgeon General, LTC Monacci suggested Army neurosurgeons be removed from Landstuhl Regional Medical Center, Germany because the hospital infrastructure can not support the practice. During the interview he added "Commanders feel they can put us anywhere and then they have neurosurgical capability but they don't."

This leads to the difficult task of managing assignments for surgeons. The interviewees warned that the authorized numbers of neurosurgeons at each medical center are not aligned with

the patient population, clinical services, and resources that support the practice of full-spectrum neurosurgery. COL Leech said, “It is the practice of the art that we don’t facilitate very well. We sometimes put our people in places where they can’t practice the full-spectrum of their specialty” (personal communication, 14 February). It is not intuitive, as COL Leech described, “If you told the average person that Fort Hood and Fort Bragg don’t have a neurosurgeon they would be shocked.” Although those are the two most populous installations the beneficiary population could only support one neurosurgeon. It would be unfair to assign a single neurosurgeon without the opportunity for consultation, mentorship or supervision. In contrast, Fort Gordon is the premier assignment for neurosurgeons because of the resource sharing agreement with the Department of Veteran’s Affairs and the University of Georgia Medical Center.

Other assignments may call for additional surgeons but be limited by the lack of clinical services. Still other assignments support a trauma mission for which LTC Monacci pointed out two challenges. First, the two neurosurgeons at Fort Bliss, for example, provide on-call support to the emergency room every other night while national professional societies advocate every third night as the maximum responsibility. Second, support to the emergency room, even a Level I Trauma Center, does not provide the complexity and variety of cases needed for a neurosurgeon to remain fully proficient or professionally satisfied (personal communication, 21 February 2001).

The role of the specialty consultant was frequently cited as the critical link between the corporation and the surgeon. The consultant is a senior physician charged with advising the AMEDD on policy and assignments of the specialty physicians. Most interviewees cited little contact with the consultants, in general, and one interviewee questioned their need for more

assistance. The consultants are practicing physicians who may or may not have additional support to communicate with the physicians, analyze their practice, or study AMEDD policies.

From his position in personnel management, COL Weightman, Chief of the Medical Corps Branch, emphasized career development during the interview (personal communication, 28 February 2001). He advises that Medical Corps Officers pay attention to their whole record including military education, clinical competency measured by board certification, and leadership positions. This new emphasis is due, in part, to the fact that "four years ago all the promotion [and] command selects and school boards, switched so that they are not exclusively AMEDD board members, but half and half now ACC [Army Competitive Category] and AMEDD." In general, an officer should seek a mix of assignments in field units and fixed facilities, and a mix of clinical and leadership positions, including 60A administrative positions. Recognizing that 60A positions are difficult for the smaller specialties, COL Weightman said the consultants realize they would be "cutting their own throats" by avoiding these positions. Their specialty would eventually lose its presence in senior staff or command positions. In contrast, LTC Monacci noted, "We spend 4 years of medical school and 7 years of training after that, very few of us want to leave to be an administrator" (personal communication, 21 February 2001). COL Leech is the current exception and is assigned as the Commander of Winn Army Community Hospital.

Another perspective on the management of neurosurgeons is the Army's wartime need for this specialized skill. An interview was conducted with COL Anita Schmidt who is the combat developer nurse consultant and Chief of the Force Provider Division, Directorate of Combat and Doctrine Development (DCDD). She is also a senior Army Nurse Corps Officer with experience on a neurosurgical team. From her perspective, the wartime need for neurosurgeons is

undoubtedly the treatment of traumatic injuries (personal communication, 2 April 2001). The current doctrine assigns two neurosurgeons to each Hospital Augmentation Team, Head & Neck. There are currently 12 teams required, 8 are resourced or funded, 2 in the active duty component and 6 in the reserve component. These teams, by doctrine, are assigned to Echelon Three hospitals in the Corps Area where general surgery, and at times specialized surgery, is performed to return patients to duty or stabilize them for evacuation. In the model DCDD uses to estimate casualties, 19 of the 268 patients condition codes require an admission call for neurosurgeons. One is a disease code. The other 18 codes describe traumatic injury. LTC Pat McMurry of the Force Structure and Analysis Branch said new doctrine is currently being studied that will reduce the scope of surgery performed in the theater. Only the essential care will be performed in the theater. Essential care entails the medical treatment required to return a soldier to duty within the theater evacuation policy or stabilize the soldier for further evacuation. New doctrine, supporting the concept of Force Health Protection in the Army's transformation into a lighter force, "depends on the Air Force's ability to evacuate larger numbers of patients that are not stable but stabilized" (personal communication, 3 April 2001). He then explained that this doctrine is still under study. Even if approved, it would take several years before the doctrine is fully integrated into the personnel authorizations.

Summary

The assessment of providers is evolving partly as a natural evolution of the medical practice driven by professionalism of the doctors, partly by technology and improvements in psychometrics, and partly due to the increased demands of consumers. The professional societies, such as the LCME, ACGME, and ABMS, are seeking to create a coordinated assessment that improves the validity of competence assessments. Otherwise, the government or

large healthcare purchasers will set the definition for the industry. Thus far, the evolution emphasizes a single model of competence and a robust recertification process. As the findings now focus solely on neurosurgery, two key points are noted in the initial rounds of interviews. First, the dissatisfaction with pay, support, and the working environment have a cumulative effect leading to low morale and low retention. The lack of retention removes a neurosurgeon from the AMEDD "just as he gets his stride" (William Monacci, personal communication, 21 February 2001). Second, the management of assignments in a small specialty is a particular challenge. The full-spectrum of Neurosurgery requires highly specialized clinical support and services that are not available at many locations due in part to a misallocation of resources.

Quantitative Data

Records of operations on the nervous system from the Standard Inpatient Data Record (SIDR) were obtained for fiscal year 1999 and 2000. The records pertain to patients admitted into military facilities. The set of records was defined by the appearance of one or more International Classification of Diseases 9th Revision (ICD9) Clinical Modification Codes (01 through 5.9) in any of the 20 procedures listed in the SIDR record. The purpose of this section is very limited. The set of inpatient records does not profile individual physicians nor does it uniquely define the neurosurgeons' workload. It does provide a gross perspective of the medical need and relative mixture of cases. This data set is used to complement the qualitative data by offering descriptive statistics, but no inferential statistical analysis is conducted.

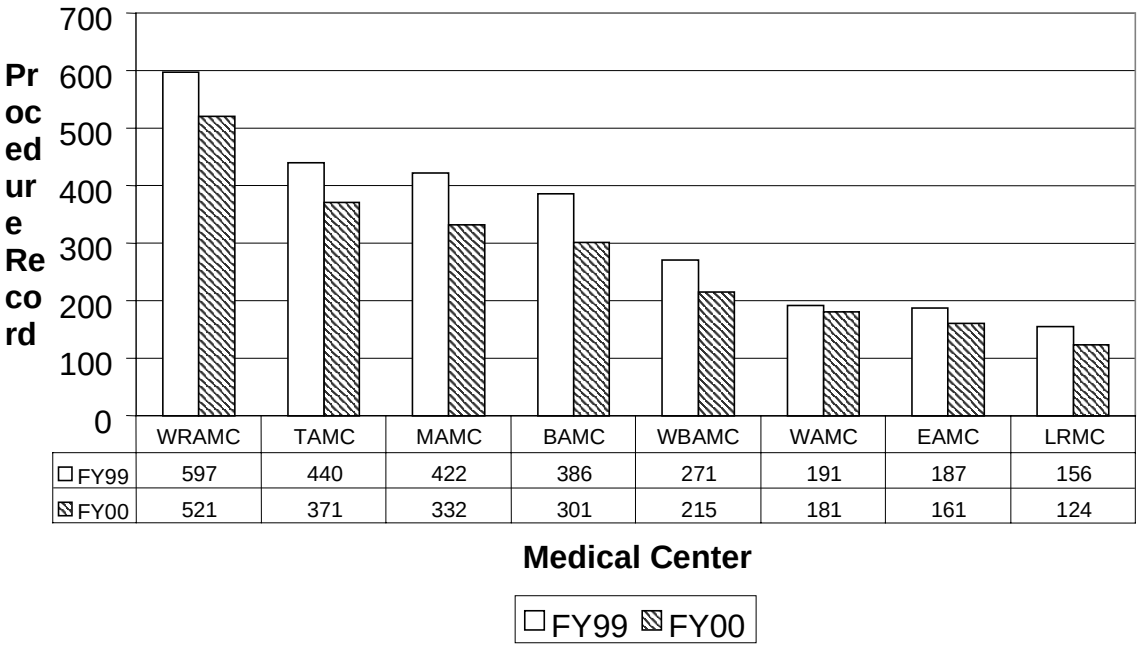
The data set contained 22,810 records split between the three services: 46 percent (10,445 records) Army, 37 percent (8,383 records) Navy, and 17 percent (3,982 records) Air Force. There were 12,765 records in fiscal year 1999 and 10,045 in fiscal year 2000, a 21 percent reduction. The reduction was not even, while the Army experienced an 18 percent reduction and

the Navy a 14 percent reduction, the Air Force experienced a 40 percent reduction in the number of operations on the nervous system.

Of the Army inpatient records, 4,856 were recorded at eight medical centers: WRAMC, Tripler Army Medical Center (TAMC), Madigan Army Medical Center (MAMC), Brooke Army Medical Center (BAMC), William Beaumont Army Medical Center (WBAMC), Womack Army Medical Center (WAMC), Eisenhower Army Medical Center (EAMC), and Landstuhl Regional Medical Center (LRMC). Figure 2 shows the volume of records at each medical center for fiscal year 1999 and 2000. The generally downward trend depicted in Figure 2 mirrors the total reduction of inpatient admissions experienced by the healthcare industry in general.

Figure 2

Army Medical Center FY 99 and FY 00 SIDR Records with Operations on the Nervous System



	WRAMC	TAMC	MAMC	BAMC	WBAMC	WAMC	EAMC	LRMC
FY99	597	440	422	386	271	191	187	156
FY00	521	371	332	301	215	181	161	124

Table 3 compares the number of cranial procedure codes with the number of spinal procedure codes for both years. The cranial procedures are defined as incision and excision of skull, brain, and cerebral menings or other operations on skull, brain, and cerebral menings. The spinal procedures are defined as operations on the spinal cord and spinal canal structures. There may be more than one procedure per record so the total numbers differs from the previous graph. The critical information drawn from Table 3 is the high proportion of spinal procedures. In the interviews, the senior neurosurgeons described a robust practice consisting of an even mix of cranial and spinal procedures. The consensus of interviewees said Army neurosurgeons experience very limited cranial cases. Most cited that less than 10 percent of surgeries concern the cranium. The methodology that obtained this quantitative data is notably different from the first hand experience of the surgeons and is difficult to interpret. Nevertheless, its concept is supported. Only 25 percent of the procedures specify cranial ICD9 codes.

Table 3

Army Medical Center FY 99 and FY 00 Procedures on Cranial, Spinal and Peripheral Nerves

	FY 1999				FY2000				
	Cranial	Spinal	Other	Total	Cranial	Spinal	Other	Total	Change
WRAMC	212	437	44	693	223	341	50	614	-79
	(31%)	(63%)	(6%)		(36%)	(56%)	(8%)		(-11%)
TAMC	81	333	55	469	54	319	11	384	-85
	(17%)	(71%)	(12%)		(14%)	(83%)	(3%)		(-18%)
MAMC	89	350	18	457	82	246	28	356	-101
	(19%)	(77%)	(4%)		(23%)	(69%)	(8%)		(-22%)
BAMC	177	255	38	470	175	195	35	405	-65

	(38%)	(54%)	(8%)		(43%)	(48%)	(9%)		(-14%)
WBAMC	94	206	30	330	78	161	18	257	-73
	(28%)	(62%)	(9%)		(30%)	(63%)	(7%)		(-22%)
WAMC	4	165	17	186	1	124	55	180	-6
	(2%)	(89%)	(9%)		(1%)	(69%)	(31%)		(-3%)
EAMC	87	165	13	265	74	147	20	241	-24
	(33%)	(62%)	(5%)		(31%)	(61%)	(8%)		(-9%)
LRMC	15	116	26	157	16	101	15	132	-25
	(10%)	(74%)	(17%)		(12%)	(77%)	(11%)		(-16%)
Total	759	2,027	241	3,027	703	1,634	232	2,569	-458
	(25%)	(67%)	(8%)		(27%)	(64%)	(9%)		(-15%)

Tables 4 and 5 examine the procedure codes for operations on the nervous system that were recorded in the medical centers during fiscal year 2000. The key points to draw from these tables is a better understanding of the patient demographics a neurosurgeon is likely to treat. Only 25 percent of the patients were active duty soldiers and 37 percent are patients aged 18 to 44 years. These results are important for the conceptualization of proficiency among Army neurosurgeons that includes the support of military readiness and the balance of wartime requirements with peacetime healthcare.

Table 4

Patient Ages for Operations on the Nervous System in FY 00

	Age Range (years)								
	0 to 4	5 to 14	15 to 17	18 to 24	25 to 34	35 to 44	45 to 64	65 +	Total
WRAMC	63	29	10	57	67	79	118	98	521
	(12%)	(6%)	(2%)	(11%)	(13%)	(15%)	(23%)	(19%)	
TAMC	91	20	7	27	41	47	52	47	371
	(27%)	(6%)	(2%)	(8%)	(12%)	(14%)	(16%)	(14%)	
MAMC	135	16	14	18	35	28	64	61	332
	(36%)	(4%)	(4%)	(5%)	(9%)	(8%)	(17%)	(16%)	
BAMC	2	0	7	31	44	36	91	90	301
	(1%)	(0%)	(2%)	(10%)	(15%)	(12%)	(30%)	(30%)	
WBAMC	38	6	4	24	24	24	45	50	215
	(18%)	(3%)	(2%)	(11%)	(11%)	(11%)	(21%)	(23%)	
WAMC	69	0	24	39	19	21	2	7	181
	(38%)	(0%)	(13%)	(22%)	(10%)	(12%)	(1%)	(4%)	
EAMC	3	2	18	24	34	49	2	29	161
	(2%)	(1%)	(11%)	(15%)	(21%)	(30%)	(1%)	(18%)	
LRMC	25	4	17	34	29	10	4	5	124
	(20%)	(3%)	(14%)	(27%)	(23%)	(8%)	(3%)	(4%)	
Total	426	79	44	216	308	296	450	387	2,206
	(19%)	(4%)	(2%)	(10%)	(14%)	(13%)	(20%)	(18%)	

Table 5

Patient Beneficiary Categories for Operations on the Nervous System in FY 00

Phase II Interview Findings

	Beneficiary Category							
	Active Duty	Active Duty Family	Retired	Retired Family	Survivor	National Guard	Other	Total
WRAMC	127 (24%)	162 (31%)	128 (25%)	69 (13%)	16 (3%)	1 (0%)	18 (3%)	521
TAMC	69 (21%)	147 (44%)	36 (11%)	23 (7%)	6 (2%)	3 (1%)	48 (14%)	371
MAMC	52 (14%)	172 (46%)	73 (20%)	52 (14%)	12 (3%)	1 (0%)	9 (2%)	332
BAMC	57 (19%)	23 (8%)	89 (30%)	53 (18%)	19 (6%)	2 (1%)	58 (19%)	301
WBAMC	40 (19%)	60 (28%)	32 (15%)	35 (16%)	6 (3%)	0 (0%)	42 (20%)	215
WAMC	68 (38%)	85 (47%)	12 (7%)	12 (7%)	4 (2%)	0 (0%)	0 (0%)	181
EAMC	72 (45%)	17 (11%)	24 (15%)	38 (24%)	7 (4%)	3 (2%)	0 (0%)	161
LRMC	58 (47%)	50 (40%)	9 (7%)	1 (1%)	1 (1%)	0 (0%)	5 (4%)	124
Total	543 (25%)	716 (32%)	403 (18%)	283 (13%)	71 (3%)	10 (0%)	180 (8%)	2,206

The second phase of interviews focused on active duty military neurosurgeons. Nine surgeons assigned to six different facilities were interviewed using the semi-structured interview schedule shown in appendix B. The questions began with the very familiar topic of Continuing Medical Education and developed into more complex, open-ended questions that sought the surgeon's perceptions on competence. Although the interviewees described a wide range of

experience in the military, there were recurring ideas. These interviews expressed that the critical elements of proficiency are the established mechanisms in physician practice; board certification, continuing medical education, credentialing and privileging. Specific to the medical practice in the military were three additional concepts: Low retention as a factor of low pay, poor clinical support and available hospital services, and bureaucratic and administrative distractions including military training. Concerns about inadequate volume and case mix remained important, but the variance of experience and opinion was so great that, like the quantifiable data, it was not easily interpreted. The results of these interviews are presented in six sections that follow the course of the interview schedule.

Continuing Medical Education

Overall, the physicians perceived that the number of continuing education events for which they received funding from the Army was below the required or desired number. All described attending one funded event per year or once every other year. Two or three events per year were viewed as necessary to satisfy board certification requirements. Some noted that the lack of funding prevented them from attending events while others paid for conferences themselves or attended local training events. All interviewees were very satisfied with the national events they did attend. The national conferences, sponsored by the American Association of Neurosurgeons for example, provide state of the art training combining both hands-on skills and information. Neurosurgeons at Landstuhl faced a special challenge and were limited to one event per three-year assignment. On the other hand, neurosurgeons at WRAMC were routinely exposed to training events as part of the residency program and neurosurgeons assigned to ERMC obtained additional opportunities from the Medical College of Georgia.

Administrative Support

Most locations complained about the amount and quality of administrative support. Two locations mentioned recent improvements in secretarial support only after a prolonged battle with the hospital. Still, the quality of support remained dubious. Basic administrative functions such as receiving phones calls, responding to routine correspondence, and maintaining calendars is not trusted to available office staff. The impact of poor administrative support is substantial. When asked, most physicians said approximately 20 percent of their time is spent on tasks that would be better delegated to administrative personnel. Moreover, except the two working at the VA, every physician cited the administrative burden as one of the top three most dissatisfying aspects of their practice. The three surgeons at the ERMC work at the VA hospital where both the military and the VA provide an administrative assistant. Those physicians recognized that they were lucky to have such “wonderful” support.

Clinical Support

The perception of the clinical support given to neurosurgery is difficult to summarize. The majority of interviewees described the overall clinical support as poor or very poor. Two interviewees noted improvements over the last two years and stated that the clinical support was good. Additionally two locations described that the creation of dedicated teams, such as an orthopedic-neurology team, lead to dramatic improvements. There were three reasons for the low opinion of clinical support. First, the military operating room technicians are clearly perceived as inexperienced. Like most soldiers, they are frequently reassigned and they received a wide range of training and experience. One physician described the soldiers by saying that at best they become adequate in everything, but good at nothing. The civilian operating room technicians are more experienced and are often dedicated to neurosurgery. The second reason is

that the majority of locations do not have physician assistants or nurse staff assigned to the neurosurgical department. Six physicians stated that a third or more of their time is spent on tasks that could effectively be delegated to another healthcare professional such as a physician assistant. Additionally, ancillary staff with special training in neurosurgery would greatly increase quality of care and patient satisfaction. The third reason the surgeons perceived clinical support as poor recalls the previous findings emphasizing the infrastructure needed to support full-spectrum neurosurgery. With little variance, five locations were described as adequate with minor shortfalls such as a need for more support in radiology, a very competitive specialty. Landstuhl clearly does not support the full-spectrum of neurosurgery. The neurosurgeons noted that they would need supporting sub-specialists in orthopedic, vascular, or plastic surgery to perform more complex cases. Without the proper radiology services, they cannot attempt any of the three complex cases LTC Monacci described as the benchmarks for neurosurgical proficiency. The opposite example was again ERMC. The neurosurgeons were pleased with the competence of the clinical support in the operating room and in the clinic. They also have two physician assistants assigned to their department, and access to three full-time neuroradiologists.

Logistics

In general, the interviewees were pleased with the level of logistical support they receive. They did not perceive that their practice was limited solely by the level of logistical support or the available equipment. More pertinent, material services and equipment was not perceived as a critical element in the discussion of proficiency. Rather, logistics is seen as one of many supporting functions that are necessary conditions for the full scope of practice.

The interviewees ranked the logistical support as satisfactory and in many cases ranked it as excellent. When given the opportunity to comment in detail, the answers varied even among

surgeons at the same location. One neurosurgeon described the availability of equipment as clearly superior to private practice. Three expressed frustration with the time it took to procure the equipment. One described a purchase request that took three consecutive neurosurgeons over the course of six years to complete. That anecdote is tempered by acknowledging the fact that purchasing major equipment and managing capital investments is a difficult practice throughout the healthcare industry. However, that interview, with a neurosurgeon from Landstuhl, expressed strong dissatisfaction with the level of support and suggested that surgical performance was modified due to limited supplies and equipment.

Surgical Practice, Cases, and Volume

Although concerns with surgical cases and volume were a primary reason for this exploratory research, the interviews did not define a clear or consistent problem. When describing their practices, if the volume or complexity of the cases was lower than desired, it was expressed with resignation or with deference to the universal challenges of the neurosurgical specialty.

It is difficult to generalize the responses. Most interviewees described that they have three or four cases per week and that 90 percent of their cases involve routine spinal work. However, the interviews differed greatly depending upon the location. Walter Reed has a unique perspective because of the demands of the residency program and the concentration of neurosurgeons at that location. The availability of cases was described as adequate overall but inadequate in certain subsets. Landstuhl has the most pronounced difficulty obtaining the cases needed to maintain and improve proficiency. Their beneficiary population is almost entirely healthy, young soldiers. Their surgical cases were described as 90 percent spinal cases and an occasional “head bump.” More important was the limited scope of practice noted earlier; neurosurgery at Landstuhl is only

scheduled for two days per month and all the complex cases, 30 percent of their patients, are passed to WRAMC. The interview at WBAMC emphasized the mission supporting the emergency room noting that 20 percent of the cases involved trauma. Once again, the neurosurgeons assigned to ERMC and working at the VA hospital expressed the greatest satisfaction. They described working four to seven cases per week, overwhelmingly on adult patients, and that 25 to 40 percent were intercranial surgeries. The complexity of their cases, one noted, is slightly higher than the average private practice surgeon.

In addition to location, the responses reflected personal attitude and preferences. One interviewee described that he aggressively pursues cases and that leads him to perform significantly more surgeries than his peers and probably more than private surgeons. A surgeon interviewed at WBAMC, where 20 percent of his cases came through the emergency room, expressed overall satisfaction in the practice and a particular interest in trauma cases. Tangent to that subject, many interviewees were greatly dissatisfied with the time that they spent on-call to the emergency room. They noted that being on-call every other night or every third night was much more than demanded of civilian physicians or of other specialties.

All interviews found that surgeons ranged from satisfied to greatly dissatisfied with their practice depending upon their personal experience and preference. In analyzing this data, three perspectives were consistent. First, no neurosurgeon interviewed believed his or her current assignment posed a serious threat to obtaining or maintaining board certification. Several interviewees had recently submitted information on the volume and case mix of their practice and were approved to continue the process. Additionally, one perceived that a military physician could obtain time to prepare for board examinations without managing the business of a practice. Second, the opportunity to practice full-spectrum neurosurgery with a high percentage of cranial

cases is a challenge to the profession, not just the military. The sub-specialization within neurosurgery demands that complex cases be referred to medical centers and to surgeons with detailed experience and knowledge of specific procedures. Therefore, surgeons who desire to gain experience and practice their art must compete for the positions that receive complex cases and must pursue complex, cranial cases. One interviewee believed that surgeons in the civilian network accept the low reimbursement that TRICARE offers, not for the payment, but for the continued experience in complex cases. This leads to the final perspective that addresses the management of TRICARE. It is widely perceived that TRICARE is the primary cause of a reduction in the volume and complexity of cases. For example, the patient access standards which limit the distance a patient will travel to obtain care was the most quoted point. In general, the perception was that the TRICARE system was "leaking" qualified patients and the experience they represent into the network. Several surgeons did not believe the medical centers managed the senior population well. One expressed frustration with transferring patients between military hospitals. Another expressed strong frustration with the inability of the AMEDD and the VA to coordinate. TRICARE certainly is a significant change to military medicine but it is only one of many changes. Whatever the cause or combination of causes, the neurosurgeons perceive that the administrative burden is up and the surgical experience is down. One interviewee clearly perceived that the military used to be a great place to gain neurosurgical experience and the opportunity to practice cranial cases without the burdens of malpractice insurance or managing private practice.

Outcomes

The surgeons were asked about the credentialing and privileging process, the use of risk-adjusted outcomes, the availability of quality assurance and medical infomatic staff at the

hospital, and the relevance of these measurements to surgical competence. The results showed a split between the perceived role of the hospital and the physician. All interviewees quickly stated that the credentialing and privileging process were standard. Dismissing the topic, it was viewed as the corporation's role in measuring proficiency. Then, many interviewees were immediately familiar with neither the term, risk-adjusted outcomes, nor the purpose of asking about such metrics. All surgeons noted that the department of surgery or the hospital produced a variety of quality assurance indicators, frequently described as standard measurements. All interviews recorded satisfaction with the hospital's level of support in providing analysis, but the interaction was limited. The clear impression was that the surgeons do not ask for quality assurance or statistical data. One joked, albeit seriously, that any initiatives to better analyze the practice just increases the doctor's paperwork. The perception is that measuring and studying outcomes is the personal responsibility of the physician. They emphasized that they maintain their own detailed records for self-evaluation and for the certification process.

Discussion

Conceptual Model

The first goal of this research was to clarify the concept of provider proficiency in order to more accurately describe what is proficiency in the specialty of neurosurgery. Through the course of the literature review and data collection, the conceptual model was refined (Figure 3). It attempts to document as fully as possible the critical elements of proficiency in military neurosurgeons and their relationships. Before examining this model, the definition of proficiency is expanded and changed from the dictionary entry used earlier. Pursuant with this research, proficiency is the state of sustained and continuously growing skills, knowledge, and abilities derived from training and experience that assures a healthcare provider is fully qualified

to practice independently and effectively with a high degree of skill. Proficiency for military healthcare providers includes a unique set of tactical skills, an emphasis on required military medicine concerns, and the embodiment of military bearing and pride germane to the Armed Services. Using this definition, the model is reviewed.

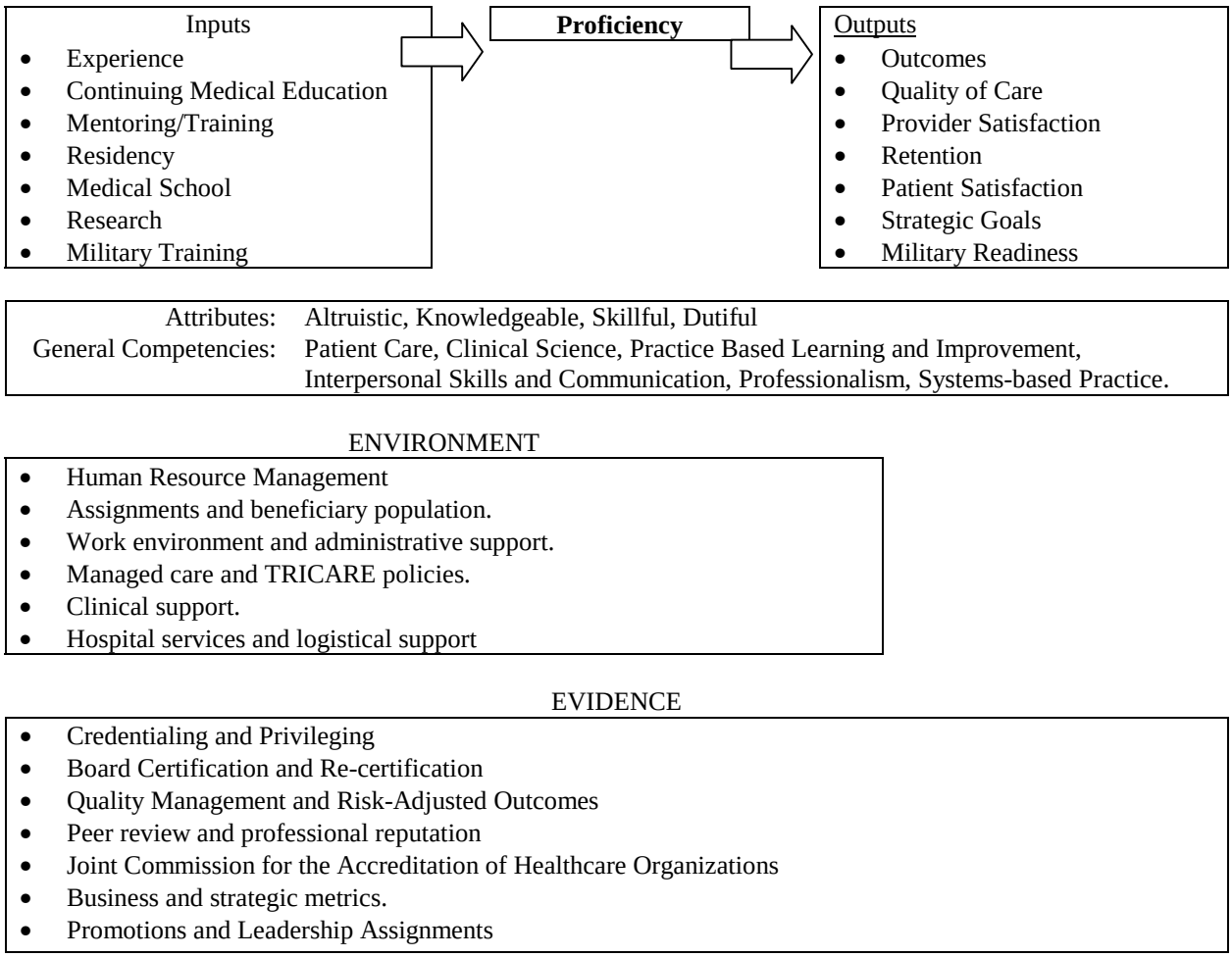
The model flows left to right, from the inputs that build proficiency to the outputs, or benefits, that reflect a high level of proficiency. The attributes accepted by the LCME and the general competencies accepted by ABMS and ACGME are now included in the model. In addition to being a set of criteria validated by experts, the attributes and general competencies represent two important goals. The first is to strengthen assessment of physician performance by creating a continuum in which the tools and standards are consistent throughout a physician's career. The second goal is to ultimately achieve validated measures that assure the industry and the public that an individual is competent. Underlining the model are the environmental influences effecting individual and organizational performance and the evidence, or metrics, used by the organization to assess proficiency.

Although there is still significant room for debate, the order in which the elements are listed reflect the relative importance gleaned from the interviews. In these nuances may lay the value of this model. Perhaps it will lead to a greater understanding of where policy can make an effective and positive influence. Displayed in the model, experience is the most critical input because the focus of the research was on the continuing development of skills after the well-regulated standards of the formal education process. Experience is the key to practicing the full spectrum of neurosurgery. The most critical output is improved outcomes. Whether assessing an individual, a hospital, or a health system, the experts concurred that, ultimately, successful clinical outcomes is the primary consideration. Military readiness, on the other hand, is the least

important output and reflects the overwhelmingly negative opinion surgeon's held of military obligations, training, and deployments.

Figure 3

Neurosurgical Proficiency Conceptual Model



The working environment has many important elements that influence proficiency. This reflects the fact that complex healthcare depends upon a robust system and teamwork. However, the human resource functions, including pay, recruiting, staffing, and morale, are barriers to improving proficiency among military neurosurgeons. Finally, the credentialing and privileging process is the most accepted evidence of proficiency. It is the process that emphasizes the local

review of individual physicians by their peers and is the process often cited as the organization's only method currently available to evaluate proficiency. Board certification was equally important, as it is the nationally accepted measure of continuing professionalism and is frequently used as a criterion for a hospital's privileging process. Having established a conceptual model, the discussion must progress towards increasingly specific findings concerning Army neurosurgeons and the implications on management and readiness. Before addressing the specific research question, the ideas in the model and the data from the interviews express four critical findings.

Critical Findings

The disparity in monetary compensation between military and civilian providers is the most consistent and critical environmental factor in assessing the proficiency of the neurosurgeons. This research was not designed as a survey of physician job satisfaction. But, as I was frequently admonished, it does not take a brain surgeon to figure out that you cannot attract or keep high quality personnel in this profession if you pay them so poorly.

LTC Monacci described the military pay in the bottom 3% of the profession. This is supported by the research of the Center for Naval Analysis where even at 17 years in service, the net present value of military pay, including all benefits and retirement, does not equal the net present value of median earnings should the surgeon separate from the military and enter private practice. With rare exception, the retention rate of neurosurgeons is zero. No practicing neurosurgeon interviewed indicated a desire to remain in the military after their current military obligation. In his annual consultant's report to the Army Surgeon General, LTC Monacci, projected that by 2003 only 14 of 26 authorizations will be filled.

Pay is the most critical finding concerning provider proficiency because experience, demonstrated by the national standards of board certification, is the most accepted, clearly defined, and useful measure of proficiency. The AMEDD boasts that 88% of its physicians are board certified but only 7 of 19 (37%) of its neurosurgeons are board certified. Typically, the neurosurgeon's military obligation runs out just before or just after they qualify for board certification. Although business research has shown that dissatisfaction with pay is not normally the prime cause of employee turnover, it is clearly and rightfully a prime cause in this case. All discussion of Army neurosurgeons and the concept of proficiency must be subordinate to the disparity in pay between military and civilian surgeons.

The second critical finding is that, in addition to pay, the military fails in the other predictors of employee turnover. As is clearly shown in the interview data, morale among neurosurgeons is low. The perception is that the administrative burden, lack of staff, and routine demands of military service create an unprofessional atmosphere. Additionally, the perception is that the medical practice is hindered by the low number of cases, poorly trained clinical staff, and inadequate ancillary services. Although the low morale reflects the majority of neurosurgeons, these findings are not consistent throughout the entire sample. Each individual expressed different experiences, goals, and desires. Several expressed some optimism about their some part of their military service or their current assignment. Comparing the assignments displays the most pronounced variation. Consider, for example, the difference between Landstuhl were all frustrations were emphasized, and the ERMC resource sharing agreement with the VA where all frustrations were absent. Only the few neurosurgeons fortunate to be assigned to Fort Gordon or to a site that meets their personal needs perceive the Army as a good experience.

Thus far, the findings will not surprise the leadership of the AMEDD. Physicians' negative perceptions about pay, administrative support, and medical practice are well known. The third finding is more encouraging. The interviews with military officers and employees showed a high degree of consistency with the literature and with civilian experts. It suggests that the AMEDD is doing the right things. More precisely, it suggests that the military is struggling with the difficult concepts of quality and proficiency along with the healthcare industry. Additionally, it is encouraging that current initiatives and studies are focused on the topics consistently raised by the interviews. For example, compensation among Army physicians is being addressed by the Center for Naval Analysis and was addressed by LTG Peake's testimony to a Congressional Committee. Or for example, concerns about providing a meaningful practice to specialist is being addressed by Health Policy & Services through the implementation of TRICARE for Life and by measurement of staffing ratios. It is, however, discouraging that these topics have a long history, literally discussed for decades. The possible or partial solution to these problems may not prevent neurosurgery from falling to low of 14 by 2003 because of the number of years it requires to train a neurosurgeon. It is a great challenge. Nevertheless, the consistency between military and civilian subject matter experts suggests that the AMEDD's perception of provider proficiency and the processes necessary to manage it are appropriate. The civilian industry is also struggling with the concept. The AMEDD's challenge is to remain in-line with the civilian industry and overcome unique challenges such as the management of assignments and military readiness.

The final key point discussed here is the disparaged role of military readiness in the data collection. Physicians had a strong negative opinion about military training. Their perspective is understandable. They are highly trained and specialized professionals who have dedicated

years of study in order to become doctors, surgeons, and finally neurosurgeons. They will be averse to taking time from their demanding schedules with military training that is not relevant to their daily work or chosen profession. It is understandable, but the degree of the schism is notable. Not a single interviewee described a positive military training or deployment experience.

Implications

The second research question asks, what is the implication of neurosurgical proficiency in the military? The answer lies in understanding the limits placed on this specialty. Recall that COL Leech said, "It is the practice of the art that we don't facilitate very well. We put our people in places where they can't practice the full-spectrum of art" (personal communication, 14 February). Clearly the scope of practice is limited by assignments, beneficiary populations, ancillary services, and clinical support. Retention is a severe limitation that stretches resources and reduces the base of experience and knowledge in the system. The practice is also limited by the requirements of the Army. By doctrine, the wartime requirement is almost exclusively limited to the stabilization of patients who have received a traumatic injury. To expand upon the implications the discussion returns to the four research sub-questions defined earlier in this study.

What are the stakeholder's perceptions on the concept of provider proficiency? There are two disparate perceptions. As professionals, the surgeon's concept of proficiency includes the full-spectrum of practice and the art of neurosurgery. Therefore, proficiency in the AMEDD is poor because neurosurgeons are limited by meager practical experience and noncompetitive career opportunities. On the other hand, the AMEDD, if personified, has a more favorable view of proficiency. All the appropriate quality safeguards are in place and neurosurgeons are fully qualified to practice within the scope of practice defined by the privileging process.

What can be reasonably used as a metric of neurosurgical provider proficiency? From the organization's perspective, the systems that measure proficiency, licensure, credentialing, privileging, and board certification, are in place. Additionally, the AMEDD measures outcomes, the primary consideration, and manages exceptions through a wide range of tools. The measurement of proficiency will not change until the healthcare industry changes the standard requirements through a deliberate, developmental process. From an individual's perspective, the missing metrics are those that gauge the value of the practice, the morale of the provider, and the elements that attract and retain high quality physicians so that they stay in the Army and develop into board certified physicians proficient in the full spectrum of practice.

How can this information be used to drive policy decisions concerning neurosurgeons? Clarified or improved understanding may by itself lead to improved management of this specialty. However, there were very few new concepts introduced in the findings. The problems of low morale, disproportionate pay, and inadequate staff were well known. The value of this research is in recognizing the fact that the Army does not need full-spectrum neurosurgery. If it did, it would have it already.

Can this information be generalized to other surgical specialties in the Army? The majority of the data was specific to Army neurosurgeons and it would not be appropriate to generalize their opinions. However, the concepts extracted from this research build a solid foundation for examining other specialties. The first series of interviews contacted a wide range of subject matter experts. The basic findings concerning proficiency, such as the reliance on credentialing and board certification as evidence of competence, the understanding that risk-adjusted outcomes is not widely used due to complexity, and the acceptance of a single evaluation model by professional societies is applicable to the healthcare industry. This research

provides confidence that the AMEDD has the appropriate processes that ensure a proficient medical staff and is consistent with civilian industry leaders. Other specialties in the AMEDD are facing challenges similar to those of neurosurgeons. In order to generalize the results, however, a very close comparison must be made with the length of the residency and training programs, the assignments and workloads of the surgeons, and the market demand for the particular specialty. The conclusion of this research emphasizes the importance of achieving organizational goals through effective and creative human resource management. This idea is applicable to all specialties. The recommendations, however, use the interview data to specifically address the management of active duty neurosurgeons.

Conclusions and Recommendations:

Examining the definitions and the concepts is essential to implementing health policy. Yet at the conclusion of this study, defining proficiency remains a challenge. The neurosurgeon, who has dedicated years to the study of a highly specialized surgical skill, will undoubtedly include the full-spectrum and the art of the practice in the definition of proficiency. The Army will define proficiency very differently. In the military managed care environment, the Army will focus on wartime requirements and effective and efficient peacetime healthcare. Intuitively, if the Army valued the full-spectrum of neurosurgery, the structures supporting the robust practice would have developed throughout the system. Instead, the findings express low morale and low retention among surgeons; low volume and case mix in assignments, and the perception that patients are lost to the contracted healthcare network. The pertinent question becomes, not just what is proficiency in neurosurgery but does the AMEDD need proficiency in neurosurgery. Certainly any healthcare that is delivered must be delivered with the highest level of quality possible. However, the period of time that it takes physicians to complete their military

obligation may be sufficient to master the treatment of traumatic injuries and safeguard the Army's wartime requirements. The goal of retention, therefore, could be only to encourage enough young physicians to accept scholarships or enter the residency program at WRAMC. Additional research is required to determine how the Army's strategic goals can align with the concept of proficiency. Five specific recommendations that describe additional research and that address the immediate concerns of neurosurgeons are offered.

First, this research supports LTC Monacci's recommendations concerning assignments made in his annual consultant's report to the Army Surgeon General. His recommendations include removing neurosurgeons from LRMC due to the lack of hospital support and required ancillary services, removing neurosurgeons from WBAMC due to low caseload, and adding neurosurgeons to TAMC to support the higher workload. LTC Monacci's report was very consistent with the findings of this research, with the perspective that the system should foster proficiency and a robust practice of neurosurgery. He endorsed the resource sharing agreement at Fort Gordon as a winning situation for all stakeholders, and he reported discussions of a training program for physician assistants at WRAMC.

The second recommendation is to study the cost benefit relationships associated with neurosurgery. Undoubtedly, the soon to be released report on compensation for Army physicians from the Center for Naval Analysis will recommend pay increases for specialist. It must be determined how significant the pay increase would have to be to have a positive affect on retention. Moreover, there are other considerations. Would that pay increase offset the cost of a full scholarship or WRAMC residency? Would an increase in pay, and subsequent increase in retention and proficiency, be cost effective for the kind of surgery we are asking them to do? In other words, could we conduct enough neurosurgical cases in our medical centers to defer the

cost of neurosurgery currently done on the contracted network? Currently, we are assigning the neurosurgeons to hospitals that cannot support the complex cases or that have a low volume of cases. Ultimately, the Army would have to determine if conducting neurosurgery in military facilities is more cost effective than contracting the service and then determine if it should continue using military neurosurgeons and encourage them to stay in the military if their practice is limited.

The third recommendation is to re-examine the military training requirements for surgical specialties. Overwhelmingly, physicians consider these requirements a distraction and an affront to their professionalism. None of the surgeons interviewed participated in a deployment since Operation Desert Shield / Desert Storm. Any real use of surgeons in a real-world mission would involve a major deployment. Perhaps the required solider skill training and weapons qualification could be completed immediately when it is much more relevant. This recommendation is not made without recognizing the importance of military training to deployments and to the culture of the Army. This suggestion to re-examine the requirements simply acknowledges a profound problem. The surgeons saw absolutely no value in the local readiness training or the centralized career development training such as Officer Advanced Course. If the training requirements cannot be modified, then the quality of training should be improved.

The forth recommendation is to convey a sense of organizational strategy and vision to the surgeons. This recommendation has two goals. First, the subject matter experts and the surgeons expressed a lack of faith in the organization. Many specifically mentioned the concept of working without an understanding of strategy or goals. Communicating the Army's expectations with specific surgical specialists may improve the morale and the rapport with the

profession, even if the expectations are limited to a readiness mission. The second goal of communicating organizational strategy is to align resources effectively.

The final recommendation is to explore a paradigm shift: Do we need active duty neurosurgeons at all? Can all neurosurgeons be assigned to VA hospitals? Can we create a para-military system where surgical specialists maintain a different level of military readiness and deployment status? The current state of the specialty includes a 5% retention rate based on one individual and a 37% board certification rate that is closely bounded by the end of military obligations. Retention, as LTC Monacci stated, is the most important issue facing neurosurgery in the Army. Only 14 fully qualified neurosurgeons are predicted to remain by 2003. Can the Army manage a surgeon's career when its requirements for proficiency do not involve a full career but a limited function? This recommendation, of course, depends upon a detailed cost benefit study of the neurosurgery performed in military treatment facilities. But consider that a paradigm shift may not be far-fetched in light of the Army's transformation into new doctrine.

In conclusion, this research ends where it began. The exploration into proficiency began with a literature review of human resource management functions. The current literature emphasized the protection of intangible assets and the mandate that organizations drive their human resource managers to add value, not just administration, in order to achieve strategic goals. The concept of proficiency in neurosurgery, as supported by this research, does not accentuate a new psychometric evaluation tool or healthcare practice. The quality management processes that evaluate proficiency are in-place and will continue to develop. Neurosurgical provider proficiency in the Army depends upon the effective management of human resources and the alignment of strategic goals.

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APPENDIX A

Summary of physician evaluation methods described by Dr. Phillip G. Bashook (1994).

Written Examinations

Multiple Choice Questions: Test items are presented with a brief introductory statement and an option of four or five possible answers. The physician selects the best alternative. This examination method is used by all specialty boards to assess specialty knowledge.

Key Feature concept to assess patient management skills: A narrative clinical problem describes certain key features. The physicians' patient management skills are assessed by a series of written questions in an open-ended format. This method is used by the Medical Council of Canada to assess clinical reasoning for licensure examination.

Computer Based Assessment

Computer Based Assessment: A take-home, self-directed computer program is used to provide several components included multiple choice examinations, record review through structured forms, and simulated patient cases. The American Board of Pediatrics developed a computer-based assessment in 1993 in order to test specialty knowledge, clinical reasoning, and commitment to lifelong learning.

Computer Based Examination: A computer program simulates a clinical problem by providing feedback to the test-takers response. The National Board of Medical Examiners, for example, uses a program that accepts the physician's responses in ordinary language to avoid cued responses. This method is designed to assess clinical reasoning.

Office Record Review: Candidates complete forms on a computerized questionnaire concerning a sample of patients. The computer is used to quickly evaluate the physicians record keeping. The computer does not evaluate clinical performance. This method is used by the American Board of Family Practice.

Oral Examinations
Structured Oral Examinations: One or more specially trained experts interview the candidate on a specified number of clinical protocols in order to assess clinical reasoning and confidence in managing patients. Typically the interviews last between 30 and 60 minutes and involve 4 to 10 protocols, some questions include the interpretation of x-rays, laboratory results, or other media. In 1994, 15 of the specialty boards used structured oral examinations for initial certification and 4 used them for recertification.
Chart stimulated recall Oral Examinations: In this method an oral examination is constructed from the candidate's clinical records in order to evaluate the physician's decision making and clinical reasoning. Several boards, such as the American Board of Plastic Surgery, have used this method.
Oral Examination with live patients: The candidates are observed interviewing and examining actual patients by two or more examiners. A structured oral examination is then conducted to evaluate the physician's clinical reasoning and interaction with the patient. This method is used by the American Board of Psychiatry and Neurology for initial certification.
Observation and Performance
Practice Review: Two or more board certified specialist visit a candidates practice to conduct an oral interview and examine office charts. Patients, colleagues, and employees are also interviewed as deemed necessary to provide cross validation. This method evaluates a range of skills including clinical reasoning, interpersonal relationships, and proficiency in diagnosing and treating patients. In 1994, the American Board of Orthopaedic Surgery provided this method as an option in the recertification process.

Peer Rating: In order to evaluate a physician, his or her colleagues and professional associates are invited to provide rating of the physician's performance. Areas of concern include medical knowledge, patient management, and humanistic qualities. In 1994, this method was being developed for the American Board of Internal Medicine.

Objective Structured Clinical Examination: This method uses live actors to simulate patients. The actors provide standardized patients that allow the evaluation of specific skill sets and the comparison between candidates. For example, this method was used by the Royal College of Physicians and Surgeons of Canada.

APPENDIX B

Focused Interview Schedule

The first phase of interviews contacted a wide range of subject matter experts. A focused interview schedule was used in order to encourage a conversation rather than direct yes or no answers. The exact list of questions differed depending upon the expertise of the interviewee and the course development of the interview. However, the focus topic remained consistent with the research questions. The introduction of the interview and a sample schedule is listed below. Also, the list of significant interviewees is provided in order to describe the breath and scope of the data collection (Table A1.).

Introduction to Interview Schedule

My name is Captain Mark Dole. I am the Administrative Resident assigned to the Medical Command at Fort Sam Houston. I am conducting research for my master's degree in healthcare administration. I am conducting qualitative research on policies that influence provider proficiency in surgical specialties, specifically neurosurgery. I am attempting to clarify the readiness and management implications of the current managed care environment on military neurosurgical providers. I am gathering expert opinion to better understand the issues surrounding proficiency and to answer the question, what should a healthcare organization look at or measure to improve the practice of our surgeons.

This is the first of two phases of interviews. The purpose of this interview is to gain expert opinion and perspective on the concept of provider proficiency. At this stage in my research I am seeking a wide range of information, not just neurosurgery. The information I collect will directly add to my research on proficiency and will help formulate the questions I will ask during the second phase of interviews when I focus on neurosurgeons.

Before we begin, let me assure you that I appreciate and respect your time and opinion. I also appreciate the sensitive nature of this topic. I am strictly adhering to established research ethics. I may wish to reference this conversation and to quote you directly in my paper. I will ask for your permission to do so, I do not wish to misrepresent your opinion. This interview will last about 30 minutes. Do you have any questions concerning the purpose or nature of my interview?

Focused Interview Questions

1. Anecdotal evidence suggests that many perceive the military does a poor job of sustaining provider proficiency due in part to low case mix and patient volume. Do you concur? Why?

2. Do you perceive a trend, positive or negative, in the AMEDD that impacts provider proficiency?

3. Do you perceive any characteristic of managed care that has impacted provider proficiency?

4. Do you perceive yourself as a stakeholder in provider proficiency? Can you influence proficiency or can you just react to it?

5. What information do you routinely give to the consultants or to the command concerning provider proficiency?

6. What information concerning provider proficiency do you think is important to convey to the surgical consultants? To the Medical Command?

7. More specifically, what metrics do you think would be reasonable to capture information on provider proficiency?

8. What program or process do you see having a positive impact on provider proficiency?

9. What program or process do you see having a negative impact on provider proficiency?

10. From your perspective, comment on the difference between sustaining readiness skills and peacetime healthcare skills in our providers?

11. Please discuss the draft conceptual model. (Input – Evidence -- Output) (Figure 1.)

FIGURE 1

Draft Conceptual Model of Provider Proficiency

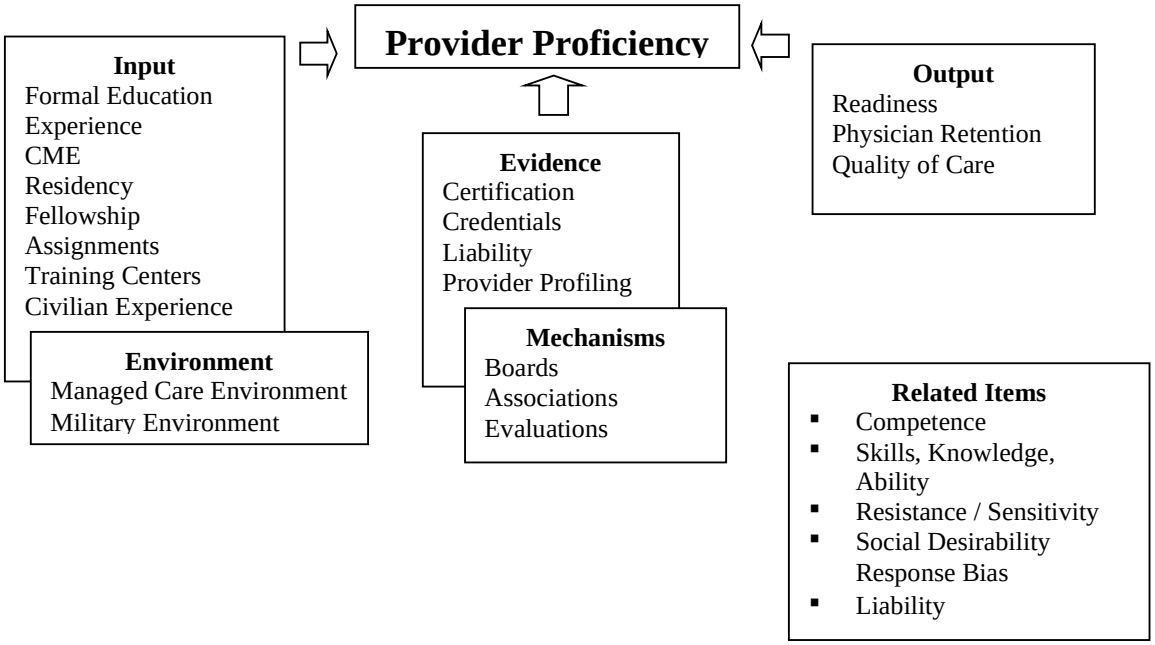

TABLE B

Names and positions of significant interviewees

Interviewee	Position	Perspective
LTC William T. Monacci	Assistant Chief, Neurosurgical Service, Walter Reed Army Medical Center and Neruosurgery Consultant	Army Neurosurgery
COL James J. Leech	Commander, Winn Army Community Hospital	Army Neurosurgery
LTL John Holcomb	Director, U.S. Army Joint Trauma Training Center, Ben Taub General Hospital	AMEDD Surgical Proficiency and Military Readiness
COL Howard M. Kimes	Director of Quality Management Directorate, U.S. Army Medical Command	Quality Management
LTC Deborah J. Cannon	Deputy Director, Quality Management Directorate, U.S. Army Medical Command	Quality Management
Dr. Charles E. Deal	JCAHO Administrator, Quality Management Directorate, U.S. Army Medical Command	JCAHO
COL Steve E. Phurrough	Director, Health Policy and Services Directorate, U.S. Army Medical Command	AMEDD Health Policy
COL John G. Kitsopoulos	Director, Personnel Directorate, U.S. Army Medical Command	AMEDD Personnel Management
MAJ Kyle C. Campbell	European Command Desk Officer, Operations Directorate, U.S. Army Medical Command	Military Readiness
COL George Weightman	Chief of U.S. Army Medical Corps	AMEDD Personnel Management
CPT(P) Scott H. Fischer	Career Manager for Surgical Specialties	AMEDD Personnel Management
COL Anita Schmidt	Chief, Force Provider Division, Directorate of Combat and Doctrine Development	Military Readiness
LTC Patrick M. McMurry	Chief, Force Sustainment and Analysis Branch, Directorate of Combat and Doctrine Development	Military Readiness
LTC Kathryn Dolter	Chief, Utilization Management, U.S. Army Medical Command	Quality Management
SGM Robert Kirk	Reserve Component Career Counselor, Retention Branch, Personnel Directorate, U.S. Army Medical Command	AMEDD Personnel Management
Ms. R. Clare Layton	Military Personnel Management Specialist, AMEDD Personnel Proponent Directorate	AMEDD Personnel Management
Mr. Roy Ball	Quality Management Health System Specialist, U.S. Army Medical Command	Risk Management

Dr. Phillip G. Bashook	Director of Evaluation and Education, American Board of Medical Specialties	Surgical Proficiency
Dr. David Nahrwold	Chair, Task Force on Competence, American Board of Medical Specialties	Surgical Proficiency
Dr. David Piepgras	Chief, Department of Neurosurgery, Mayo Clinic, Rochester, MN and Director of American Board of Neurological Surgery	Neurosurgery
Dr. Karen Sue Guice	Director of Fellowship Department, American College of Surgeons	Surgical Proficiency
Mr. Geoff Fenwick	Balanced Scorecard Collaborative	Strategic Planning and Management
Ms. Barbara Possin	Director of Strategic Alignment, St Mary's Duluth Clinic	Strategic Planning and Management

APPENDIX C

Phase II Semi-Structured Interview Schedule

Introduction

My name is Captain Mark Dole. I am the Administrative Resident assigned to the Medical Command at Fort Sam Houston. I am conducting research for my master's degree in healthcare administration. I am conducting qualitative research on policies that influence provider proficiency in surgical specialties, specifically neurosurgery.

This is the second phase of research. In the first phase I gathered a wide range of opinions concerning surgical proficiency from experts at the American Board of Medical Specialties, American College of Surgeons, and senior officer at MEDCOM. I have also interviewed to LTC Monacci and COL Leech, trying to identify the key concepts of surrounding proficiency.

I am now contacting the Army Neurosurgeons in order to understand their perceptions of maintaining proficiency in the military. Ideally, I hope my research will help guide policies that are being developed at MEDCOM. I hope to answer the question, what should a healthcare corporation look at, or measure, to assess the practice of our neurosurgeons as a group. I wish to conduct a structured interview. It will take about 15 minutes. I will start with very focused questions, some asking you to give short answers or even to rank your impressions 1 to 9, low to high. At the end I'll ask more open questions seeking your opinion and ideas.

Before we begin, let me assure you that I appreciate and respect your time and opinion. I also appreciate the sensitive nature of this topic. The results of individual interviews will be confidential. I am going to represent the findings as consensus among the neurosurgeons. For example, I might include the fact that 15 of the 19 neurosurgeons felt

Unless I obtain specific permission to quote someone directly on a certain idea, I will not attribute anything to individuals. The information I gather in interviews is for a graduate management project. Do you have any questions concerning the purpose or nature of my interview? If not, I will start with some focused questions on this topic then I'll move to more general questions asking for your perceptions.

Target Questions

CME

1. How many Continuing Medical Education events do you request to attend per year?

2. On average, how many times per year do you attend Continuing Medical Education seminars or conferences per year?

3. Are you satisfied with this number of CME events?

4. Are you satisfied that the CME opportunities available to you are pertinent to your practice of neurosurgery?

Administrative Support:

1. Do you have access to secretarial and administrative staff? (Y/N) How would you rate your secretarial staff? (Please use 1 to 9, 1 being extremely poor, 9 being extremely good, and 5 being adequate. Visualize can your telephone keypad if it helps.)

2. How much of your time is taken up with administrative work that could be appropriately delegated to secretarial staff? (Percentage)

3. Who maintains your calendar?

4. Who schedules and maintains your appointments and surgical procedures?

Clinical Support:

1. How would you rate your overall clinical support in the OR? (Please use 1 to 9. If <5, describe shortfall.)

2. How would you rate your OR technicians? (Please use 1 to 9. If < 5, describe shortfall.)

3. Do you have a PA or clinical nurse dedicated to neurosurgery?

4. How much of your time is taken up with tasks that could be appropriately delegated to PA or clinical nursing staff? (Percentage)

5. Do you work in teams? And, have you been able to build an atmosphere of teamwork and expertise?

6. Do you feel the hospital has adequate services, other specialist and departments, to support a neurosurgery? (Y/N. If not what tops the list of missing or lacking services?)

Equipment and Logistics Support:

1. How would you rate your overall logistics support? (Please use 1 to 9. If < 5, describe shortfall.)

2. Do you feel confident that your instrument sets will be prepared properly before surgery? (Y/N. If No, describe shortfall.)

3. Are you satisfied with the medical equipment relative to the scope of practice at your current assignment? (Y/N. If No, what is the most significant shortfall (lack of a specific piece of equipment, age of current equipment, lack of advanced equipment, maintenance).)

Practice:

1. In terms of professional development and satisfaction, how satisfied are you with the volume and case mix of neurosurgery practice you have had in the military? (Please use 1 to 9.)

2. On average, how many surgical cases do participate in a week?

3. How would you describe the case mix and volume your surgical practice? (i.e. mostly trauma cases, low volume, not enough complexity)

4. Are you routinely called to function as a provider outside the scope of neurosurgery? (If Yes, describe briefly.)

5. Do you feel confident your current assignment is adequately preparing you for certification boards or re-certification? (Y/N. If no, briefly describe shortfall.)

6. Are you satisfied with the interaction you have with patients? (Rank 1 to 9. If < 5, briefly describe shortfall.)

7. Are you satisfied with the interaction among your peers? (Rank 1 to 9. If < 5, briefly describe shortfall.)

Outcomes and privileging:

1. Are you satisfied with the validity and professionalism of the credentialing and privileging procedures you have experienced in the military? (Y/N. If no, please briefly describe shortfall.)

2. Does your department or medical staff examine risk-adjusted outcomes?
Are you satisfied with the clinical data you and your medical staff need to analyze outcomes?

3. Are you satisfied with the medical infomatic and biostatistical support, such as time and expertise of analyst? (Please rank 1 to 9 and provide a brief comment.)

Time and assignments:

1. Do you work on medical evaluation boards? (Y/N. What percentage of your time is spent on medical evaluation boards?)

2. What do you perceive to be the biggest distraction to your medical practice?

3. Have you attended the Officer Advance Course? Will you? What were your impressions?

4. Have you been deployed on a training or military operation? If so, was this while you were in a neurosurgical program? What operation? What were your impressions regarding professional satisfaction? Professional skills?

5. Have you participated in a labor-sharing agreement with the VA or civilian hospital? If so, where? Was it a rewarding experience?

6. What do you perceive as the top three dissatisfiers to practicing neurosurgery in the military? (Pay and two others.)

7. What prompted you to join the military?

8. What aspects of military service are encouraging and support your practice of neurosurgery?

9. What would it take to retain you in the military past your current obligation?

Proficiency

1. I've asked basic questions concerning concepts surrounding provider proficiency (experience, support staff, training). What do you feel are the important issues concerning your improving or maintaining surgical proficiency in the military?

2. What process or initiatives have you experienced that have improved or have potential for improving the practice of neurosurgery in the military?

Classification Questions:

1. Are you board certified? Board eligible?
2. When do you expect to become board certified?
3. How much military obligation do you have left?
4. Have you practiced in a civilian program either residency, labor-sharing, or in civilian practice?
5. Where did you attend Medical School?